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**Symposium on the Integration of the Medical Curriculum.**

**Integration of the Curriculum in  
the Preclinical Years\***

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The primary condition for the successful integration of the subjects of the medical curriculum is that the staff of each department should be aware of the necessity for it, and should have thought out thoroughly the relationship of their subject to the general scheme of things. All of us are aware that our own subjects are not independent, say, in the sense that mathematics is independent of latin. As a physiologist, I cannot move a step without a knowledge of anatomy, nor can I think of a single subject in the curriculum which has not contributed to my own subject. The same is true of all the other subjects. In fact, all of us are engaged in teaching one subject; i.e., medicine in the broader sense of the word—various aspects of it, it is true, but various aspects of one and the same thing. This attitude is, of course, superficially opposed to another one which has been powerfully at work in the last few decades and which has been responsible for the creation of independent departments of biochemistry, of pharmacology, etc., etc. There is no fundamental opposition if we realize that an independent department does not mean an independent subject.

Such being the case, what is the point of integration? What are we trying to do for the student? As regards the preclinical subjects, among themselves I suggest that very little can or need be done directly. The medical student, on the whole, is moderately intelligent and cannot fail to see the relationships between the various subjects he is studying at approximately the same time. In the case of ourselves, it is somewhat different. It is some years since I studied anatomy and pathology, etc., etc. In that interval I have learned a great deal of physiology. I have also forgotten much of the pathology, e.g., what I once knew—and, of course, I never knew, relatively speaking, very much. The average medical student can acquire only a sketchy idea of any one subject in the few years he is in school. Consequently, my knowledge is somewhat unbalanced. I have even a tendency to think that what is not physiology is not knowledge. This, to my mind, is the danger point. I cannot give to my students

\*Read at the Forty-seventh Annual Meeting of the Association of American Medical Colleges, held in Atlanta, Georgia, Oct. 26-28, 1936.

a point of view which I have not got myself. So, I should say, that education of the staff, primarily, and education of the students, indirectly, is our main aim here.

With regard to clinical subjects, the situation is, of course, more serious. We have all met at one time or another the clinician who says to the student entering his third year, "Now, you have arrived at the real stuff. Forget all that you have previously been taught because it is of no value to you." This is an extreme example, one which, from my observations, is fast disappearing. But while it is easy enough for those of us on the preclinical side to express our horror of such goings-on, it is, perhaps, more to the point to ask ourselves how such things came to be. I have a growing conviction that we ourselves are to no small degree to blame. This clinician was once a medical student. Nearly every medical student wants very much to become a practitioner and will spend endless effort over anything which he thinks contributes to that end. If, in my effort to prove that physiology is an independent science, I convince him indirectly that it has nothing to do with medicine, I shall have gone far to produce this unfortunate mental attitude. As a matter of fact, I feel that physiology is an integral part of medicine and that what I am teaching is a certain aspect of that science which is concerned with the human organism in health and disease.

Moreover, the practical application of theoretical knowledge is far from easy and the whole burden of teaching this should not be placed on the clinician. It is the business of all of us to help.

I believe that some such attitude as I have just outlined is essential on the part of every instructor before real integration can begin. In its absence, our attempts at integration will be artificial and sterile, and with it we have won the greater part of the battle.

Perfect integration probably means putting the whole of medical knowledge into one capsule and swallowing it at once. Suppose we begin by saying that we intend to integrate our knowledge of, e.g., the circulatory system. We will teach at the same time the anatomy, the physiology, the chemistry, the pharmacology and the clinical aspects. We shall rapidly discover that we cannot teach the anatomy of it without mentioning all the other organs in the body and so on through all the other subjects. Moreover, even if we could do so, we should thereby avoid the repetition which is one of the essentials of the learning process. The anatomist teaches, of course, the structure of the circulatory system; he also teaches a good deal of the physiology. The physiologist, on the other hand, is always referring to the anatomy of the system, and so on down the line. We must be careful not to destroy this in our zeal for new things. In any case, we must spread the teaching of the preclinical subjects over two years. We can achieve the best results in the way of repetition, in my opinion, by having subjects follow one another rather than by teaching all of them or any considerable number at one time. This still leaves something to be desired in the correlation of the various preclinical subjects and, particularly, of the preclinical with the clinical subjects.

We have been experimenting for several years in this direction at Duke, and while we have not reached anything approaching a final stage we now have a certain amount of experience. We are following pretty largely the plan of having subjects follow each other in the curriculum and are attempting to arrange the teaching of one of these so as to sum up and integrate the main content of previous courses and at the same time emphasize the clinical applications. It seems to me that three subjects are particularly suitable as a basis for this: physiology, pathology and physical diagnosis. Of these, physical diagnosis happens to be the easiest one for us to choose and I think it is the most satisfactory from all points of view.

We have already had for several years a course in physical diagnosis which we regard as very satisfactory. It has been described in the *JOURNAL* of this Association. Its essential point consists in having all clinical departments co-operate in this teaching. We are now expanding this so as to include the pre-clinical departments as well. Physical diagnosis, of course, is concerned with teaching the methods of examination, i.e., of acquiring data. It seems futile, however, merely to collect data and postpone the interpretation of them to a later stage, especially when a large proportion of the knowledge necessary for their interpretation is already in the possession of the student. The point of view we are trying to give the student is much the same as that of N. S. Stern ("Clinical Diagnosis," 1933, Macmillan) from whom I quote: "Diagnosis . . . is dependent upon three elements—the assemblage of facts, the inductive reasoning from here leading to a tentative diagnosis, and the search for new facts which may prove or disprove the tentative diagnosis." The inductive reasoning depends on a knowledge of the significance of symptoms. These can be interpreted rationally only in the light of the preclinical sciences.

I have tried to draw up for myself a sort of slow motion picture of the process of diagnosis and I think that on this scale it goes in some such way as this. To take a very simple case, let us imagine a patient with hemiplegia from hemorrhage into the internal capsule. I examine the patient and note predominantly a widespread unilateral spastic paralysis. This process of collecting data, of course, telescopes the next, that of interpreting the data in actual practice. In working them out, I turn to physiology and ask myself what light this throws on spastic paralysis and recollect that this means a break in the pyramidal tract involving the upper premotor neuron. This leads at once to anatomy for the possible positions of such a lesion and then to pathology for knowledge of such disease processes—then back to the history for confirmatory evidence. The mature clinician will, naturally, pass over this chain of reasoning very, very rapidly—so rapidly often that he is unaware what path he has followed, but I am convinced that for the student just beginning clinical work, we must make this process as clear and explicit as we can. Several other things, also, I think are worth noting. The student may have forgotten the physiology of spastic paralysis, and is almost certain to be hazy about some phase. He is thus given a stimulus at a stage when he badly needs one, and when he still has some time

for reviewing these subjects. Another point that should be noticed is that in this particular case bacteriology, biochemistry and pharmacology play no rôle. Moreover, it is impossible to cover everything that one wishes.

We have drawn up a course based on these considerations. The quarter is divided into a number of weeks, each week being treated as a unit. On Monday morning, the student is shown a case or cases, if available. Otherwise, a case history from the hospital records is used. The type of case shown must be selected carefully. We usually begin with a neurological case, but these cases can and should be varied from year to year. The clinical, physiological and pathological aspects of the case are discussed by various members of the staff. During the remainder of the week the student is taught the technique of neurological examination. He goes to the department of anatomy to work over the pathways involved in this case and similar ones; to the department of physiology, etc., etc. In each of these departments he gets something rather like a short course in applied anatomy, physiology, etc. A fair proportion of his time must be left free because at this time he usually discovers innumerable things he wants to know and does not know.

The program varies from week to week and the departments involved will, of course, not always be the same. Such a course needs careful organization and this should probably be in the hands of one member of the faculty who draws up the series of cases to be used, and, in consultation with each department, assigns the subject matter to be covered. This will not be at all a complete course in applied physiology, etc., but aims to study thoroughly selected topics covering a fairly wide range.

## The Group Method in the Teaching of Pathology\*

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During my undergraduate course at one of the Scottish Universities, I was taught pathology in the usual approved fashion, and when I became a teacher of the subject in Winnipeg I followed this fashion for many years. The entire afternoon was devoted to pathology. For the first hour I gave a lecture which the students transcribed to their notebooks to the best of their ability. The lecture was illustrated by lantern slides and pictures from books projected by the delineascope. These slides and pictures appeared on the screen for a few fleeting moments, never to be seen again. There followed a two hour period of microscope work in which the class was given slides, known or unknown, which were described in minute detail and drawn in color with equal care, a procedure which never seemed to accelerate the cerebral circulation to any appreciable degree. There was a museum with specimens in jars. Illustrative specimens were demonstrated to the class, and students of a particularly inquiring type of mind would occasionally enter the somewhat gloomy portals of the museum and gaze with awe at the samples of viscera exhibited there. Before an examination the museum would become a popular rendezvous in the hope that some of the specimens might be successfully spotted at the approaching ordeal.

After many years it began to dawn on me that there was room for improvement in this method. For one thing, there was the saying of Gibbon that "every man has two educations: that which he receives from his teachers and that which he owes to himself, the latter being infinitely the more important." Then it occurred to me that the vast majority of my students were going to be practitioners of medicine rather than pathological histologists, and that their best interests would be served by projecting microscopic pictures on a screen where they could be seen and discussed by everyone in place of each man looking at his own sections privately, not knowing what the others were seeing and describing. Finally, it was felt that the museum might be made a place where every aspect of disease could be studied, a place so attractive that students would congregate there whenever they had a spare period.

The first problem to be faced was that of the museum. The usual type of vertical museum showcase was replaced by a sloping one consisting of three tiers and built on the plan of a reading desk or magazine stand. Each stand sloped both ways, held eighty-four specimens, and was painted white. The natural and comfortable way to look at a book or specimen for any length of time is to hold it at an angle of 45 degrees instead of vertically, and the new stands were designed to hold watch glass specimens at this angle. The speci-

\*Read at the Forty-seventh Annual Meeting of the Association of American Medical Colleges, held in Atlanta, Georgia, Oct. 26-28, 1936.

mens in jars were then transferred to watch glasses. It is wonderful how large a specimen may be contained in a watch glass. Thus, both cerebral hemispheres can be mounted in this manner; so can a large kidney tumor, a cancer of the stomach, and, indeed, the great majority of pathological specimens. Long bones, strips of bowel, etc. were mounted in long glass cells made in the department.

It was soon realized that pictures could be displayed to great advantage in the same way, and when this simple truth had dawned on our mind, an inexhaustible and hitherto untapped source of wealth presented itself in whichever direction we looked. This wealth has hitherto been hidden away in books, in journals, and, above all, in atlases. Old editions were torn up, reprints of journal articles were readily obtained, and atlases provided so much material that the only difficulty was to make a judicious choice. There are several excellent pathological atlases, such as the magnificent one by Kast, Fraenkel and Rumpel, published more than thirty years ago, and the one being brought out at present by the *British Journal of Surgery*. Byrom Bramwell's *Atlas of Clinical Medicine* contains a wealth of clinical material. All the pathological pictures, both gross and microscopic, were in color, but large numbers of clinical pictures, in color as well as in black and white, soon made their appearance in the museum. To these were added negative X-ray prints, temperature charts, electrocardiograms, blood pictures, illustrations of what may be seen with the ophthalmoscope, bronchoscope, sigmoidoscope, cystoscope, etc. The history of medicine was illustrated by portraits of the men whose names are associated with diseases or who have made fundamental contributions to their study. All this and nothing less than this makes up the complete picture of disease.

The appearance of the museum had now changed so completely that former students revisiting it could hardly recognize the place. In the section on Addison's disease, the upper tier contains a painting of a patient showing the characteristic pigmentation of the skin; the middle tier a specimen of adrenal destroyed by tuberculosis, and the lower tier a picture of Thomas Addison. Graves' disease is illustrated by a photograph of a patient with characteristic exophthalmos and enlarged neck, by gross specimens and microphotographs of the thyroid, and by a portrait of Robert Graves. Hodgkin's disease is similarly portrayed clinically, pathologically and historically. In the section on contagious fevers there are dermochromes (from Jacobi's atlas) of measles, scarlet fever, smallpox, chickenpox, etc., together with temperature charts and graphs showing the effects of vaccination, diphtheria antitoxin, etc. X-ray prints are placed alongside the corresponding lesions in bronchiectasis, primary and secondary carcinoma of the lung, pulmonary tuberculosis, cancer and ulcer of the stomach, osteomyelitis and osteogenic sarcoma of bone, hydronephrosis and tuberculosis of the kidney, tumors of the brain and the pituitary, and so on. Brain tumors are illustrated by pictures of optic neuritis and secondary optic atrophy, roentgenograms of the dilated or distorted ventricles and the silver beaten skull, and photographs of Cushing and Cajal. In the section on polycythemia we have not

only the enlarged spleen but pictures in color of the patient showing the characteristic ruddy complexion and of the fundus of the eye showing the engorged blood vessels. The ductless glands lend themselves particularly well to this treatment. A specimen of pituitary tumor becomes infinitely more interesting when associated with pictures of gigantism, acromegaly and Frohlich's syndrome, supplemented by colored illustrations of the microscopic appearance in acidophil, basophil and chromophobe adenoma, together with one of the normal pituitary showing the three types of cells in the anterior lobe.

In order to save space, composite pictures are often used, by means of which seven or eight small illustrations may be included in a picture measuring 10 by 12 inches, our maximum size. In *tabes dorsalis* we have pictures of the degeneration of the posterior columns, the tabetic gait, the muscular hypotonia, the zones of anesthesia, the optic atrophy, the perforating ulcers and the Charcot joint. In pernicious anemia we have a characteristic blood film, reticulocytes, normoblasts and megaloblasts, the hyperplastic marrow (gross and microscopic), hemosiderin deposits in the liver, and posterolateral degeneration of the spinal cord. Some of us can still recall the difficulty we had in learning the habits of the various animal parasites. One composite picture shows the life cycle of the malarial parasite in man and the mosquito, the anopheles mosquito compared with the culex, the temperature charts of tertian and quartan fever, the parasites in the brain and the pigment in the spleen. Another shows a map indicating the geographical distribution of sleeping sickness, the trypanosomes in the blood, the tsetse fly, the cervical lymphadenopathy, and the native lying in his hut in the last stages of stupor. The life cycle of *Taenia echinococcus*, together with the various lesions of hydatid disease, are similarly illustrated.

So far nothing has been said about the description of the specimens. In the old museum a small label was attached to the jar with a line or two of comment, full details of the pathological appearance and clinical history being contained in the museum catalogue, which was seldom consulted. These have been combined into a catalogue card, 5 by 7 inches in diameter, on both sides of which are typed the essential pathological and clinical features, together with a small microphotograph. It is evident that in this way the student has at his disposal many hundreds of carefully selected microscopic pictures in juxtaposition to the gross lesion.

More than one card may be used if necessary. The cards are protected by a cleaned discarded X-ray film. They are kept in a narrow box, 11 cm. deep, which projects from the bottom of the lower tier for a distance of 1 cm. and runs the entire length of the stand. It is divided by transverse partitions into compartments, in each of which are kept three cards relating to the specimens and pictures in the three tiers immediately above it. The historical pictures have a brief biographical sketch. By this means the student finds all the information he can desire right beside the specimen he is looking at without the cards actually being in sight. Nothing is written on the watch glass or picture except the serial number which corresponds to that on the card.

With this new museum at our disposal, we felt that the student might be

made to use it as he uses the library. It was, indeed, a library composed not of books but of the things themselves about which books are written. The stands were of a height suitable for study by a person seated on a stool, and an abundance of these stools were provided. The effort to make the place attractive and interesting proved a remarkable success as judged by the response of the whole class.

The next problem was that of cutting down the time spent on individual microscopic work. In order to do this, the best microprojector on the market was bought and the best screen, i.e., the one with the most brilliant reflecting surface. We had used microprojectors for many years previously, but with the new equipment the projection of microscopic slides became a delight. With the low power the entire section could be seen at once, whether it was the degenerated spinal cord of pernicious anemia or a lung studded with miliary tubercles. With the high power mitotic figures were readily seen, and when the oil immersion lens was used even malaria parasites could be demonstrated. But, as will be seen presently, the fundamental idea was to make the students themselves demonstrate microscopic material to the entire class. Now that it was possible for everyone to see microscopic pictures so quickly and readily, it was found that the time for individual microscopic study could be cut down to 20 minutes or half an hour. No written descriptions nor drawings of the slides were attempted. This may seem a retrograde step to some, but in a demonstration of gross material no one expects the student to give a written description or make a drawing of the specimens shown. A verbal description is equally valuable and much more readily criticized.

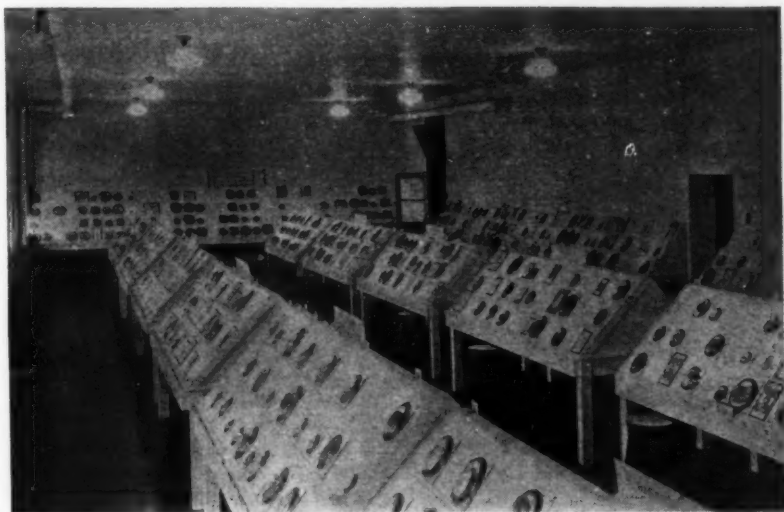
It was now discovered that the excellent reflecting quality of the new screen made it possible to project gross material by means of an ordinary delineascope such as is used for showing book pictures, without having recourse to the very expensive apparatus specially designed for the projection of gross specimens. This was facilitated by placing the projecting lantern fairly close to the screen.

Armed with really efficient methods for projecting gross and microscopic material, and with a new type of museum at our disposal, it was felt that an experiment in what may be called self-help in the teaching of pathology might be attempted. This was done in the following way.

A textbook was chosen, and a certain number of pages allocated to each teaching period of the academic year. The complete list of these pages was posted on the first day of the session. At the same time the class, which usually numbers from fifty to fifty-five, was divided into groups of three, and this list was also posted. There were from 16 to 18 groups. Each group was responsible for one or more diseases treated of in the textbook. It should be mentioned, that the class had already been instructed in general pathology by the ordinary lecture method during the previous year. By consulting the lists, the groups could tell many weeks in advance which subjects they were particularly responsible for. The entire class was supposed to read the pages for the next day's work, so that they came with minds prepared instead of knowing nothing about the subject. They were persuaded to do this by the simple device of calling out

a couple of men at random and asking them a few simple questions from the text. No one knew when his turn was coming next.

The duties of the special group, however, were very different. They had to know everything they could reasonably be expected to know about the subject; in other words, they had to master it. Their first step was to visit the museum, where they investigated the material available. If the subject was bronchogenic carcinoma, they had to know the number of specimens and read the clinical details of each case. From these they prepared an analysis of the sex incidence, the occupation of the patients, the pathological complications, such as bronchiectasis, abscess formation and distant metastases, and the principal symptoms. They chose illustrative specimens which they brought to the class room, together with any clinical, radiological and historical pictures which they could



A corner of the museum showing the general arrangement of the stands.

collect. In the library they consulted the references given in the text, and brought these to the demonstration, so that the remainder of the class in time became familiar with the leading journals and monographs. They were at liberty to demonstrate in the lantern any interesting pathological and clinical illustrations which they had come across in their reading. Gross specimens were projected in the same way. A list of the references consulted was written on the board by the members of the group before the commencement of the period. They were expected to read up the symptoms in their textbook of medicine or surgery, which they naturally possessed as they had already commenced their clinical studies. The pathological explanation of these symptoms had to be ready on their lips.

In the meanwhile, they had consulted one of the demonstrators, who has



gives one an opportunity to get to know the men, to learn their difficulties, and to indicate to them any new work which may not be contained in the references in the text. At the same time one is careful to leave the initiative to the men themselves, for in that lies much of the real educational value of the system.

Let me sum up the main ideas of this paper. The fundamental idea is that the student learns the art of self-education, and, incidentally, at the same time the art of self-expression. Five or six times during the session he has to investigate a disease for himself in the museum, in the library, in the pathological laboratory, and in the X-ray room. He not only acquires a thorough knowledge of a certain number of disease conditions, but he learns how to acquire this knowledge. The knowledge thus acquired is made available to the whole class by means of judicious questioning by the teacher. When the student comes to his clinical work, the value of the acquisition of the art of learning for himself soon makes itself felt. A second idea, which may be considered by others to be right or wrong, is that the training of the student in microscopic pathology has as its object the explanation of the phenomena of disease rather than the drilling of an embryo pathologist. Again the entire class shares in the process. The third idea is that the pathological museum may become a museum of disease in which nearly every aspect of the subject may be demonstrated, a storehouse of information to which the student instinctively turns as he would turn to the books on his desk. Pathology is the ideal field for an experiment of this kind, both on account of its central position in the curriculum and because it deals with so many matters, both pathological and clinical, which can be presented objectively and pictorially. Finally, and to repeat, "every man has two educations: that which he receives from his teachers and that which he owes to himself, the latter being infinitely the more important."

#### DISCUSSION

DR. LOUIS B. WILSON (University of Minnesota), Rochester, Minn.: I want to add a word of approval and of intense admiration for Dr. Boyd's work.

We long ago found out in graduate work that the most essential thing in diagnosis, so far as undergraduate work was concerned, was training in pathology. That is, there is a higher correlation between high grades and high standings in pathology in good medical schools and clinical grades in graduate work than there is between clinical grades in medical schools and clinical grades in graduate work.

Several years ago there began to trickle down to us from Manitoba a most astonishing group of men from the diagnostic standpoint. When we inquired to what that meant it always came back to Boyd! He has told you what he is doing, and how he is doing it. I want to add that his results, so far as we have been able to study them, have been almost unbelievably good.

It is always most difficult to get men to think in an orderly manner. Dr. Boyd has succeeded in doing that. It also goes much further than Dr. Boyd has even intimated today. We have had an unusually high percentage of high grade research work done by men who have been trained basically by Dr. Boyd. One of the reasons for that is that they have been trained to help themselves not only in acquiring new things but also in the orderly arrangement of the data they have so obtained.

So I wouldn't for a minute suggest that this sort of training is good only for the

general practitioner. It is exceedingly important for all members of the medical profession who expect to practice either general practice or a specialty, or to do high grade research work.

I think Dr. Boyd has made a very important contribution to our teaching methods.

DR. ROGER D. BAKER (Duke University School of Medicine), Durham, N. C.; It is a pity that more students of pathology in America cannot have the stimulation of Dr. Boyd and his methods. In the department of pathology of Duke University we have had the same objective in mind; that is, the development of self-help on the part of the student, but we have used different means. Major emphasis is placed on case method and clerkship in the teaching of pathology. The development of case method and clerkship in clinical medicine is one of the highest achievements of modern education. When properly applied it is a realization of the project method in inductive teaching.

The same value can be derived from the thorough analysis of autopsy cases by actively participating medical students. Groups of three pathologic clerks follow each autopsy, assisting at the work, making smears, cultures, teased preparations, abstracting the history, writing up an independent protocol and anatomical diagnosis, aiding with the cutting of blocks, writing microscopic notes, and revising their diagnosis. These groups attend the staff gross and microscopic conferences at which their cases are studied. The students often aid in the understanding of cases by supplying pertinent information or by gathering literature. They become temporary members of the department.

After a rehearsal with one of the staff members, the group has an opportunity to present its case at a student clinicopathological conference. That is not a unique idea, but I think the idea of having them become pathologic clerks, for the time being actually a part of the machinery of the department, is, perhaps, somewhat novel when it applies to all of the students.

They are given free access to the departmental record room and to the corresponding preserved gross organs and microscopic slides. The organs of individuals are preserved in containers after the method of MacCallum. The autopsy protocols contain abstracts of the clinical history and photographs of the organs, rarely of the patients during their clinical course. Students can analyze groups of cases and learn first hand from the material itself. They study disease in the whole human being and correlate it with clinical data.

They thus think, during the early part of their pathology course, in terms of a highly significant pathological unit, that is, the whole patient, a unit which has often been forgotten by pathologists in devotion to other units, such as the cell or the organ.

With students in groups of about a dozen, I have had extraordinarily good analyses of various diseases. Diabetes, for example, lends itself well to analysis of all the case material and of the clinical history. We feel that the immediateness to the material is highly important. We do not care if the students ruin specimens, because significant disease is common disease, and any case which is ruined can easily be replaced with a new case.

Our method, like Dr. Boyd's, stimulates initiative and independence in the students. It also subordinates histopathology to its proper sphere, the understanding of the disease dealt with. And finally, our method provides a wealth of material for analysis. I believe that our method lays more stress on the individual as a whole and on the close contact between the material and the student.

DR. ROY KRACKE (Emory University): The teaching of pathology can roughly be divided into two types of approach. One of these is the so-called older, orthodox method in which the student, as Dr. Boyd pointed out, was required to attend the daily lecture and then spend from three to four hours in the laboratory making drawings and studying about five or six sections, and, therefore, the course came to be somewhat of a scientific, glorified course in art, rather than pathology.

Dr. Boyd has illustrated very well what is the most pressing need in the entire system of medical education, and that is the integration or correlation of the so-called preclinical teaching and the clinical branches. He has done this by bringing together from multiple sources material bearing on the etiology, on the symptoms, on the history, on the pathologic findings, and all of those things are put together in one place, and in his particular case he does this in the museum.

Those of us who are teaching pathology all know that Dr. Boyd has been the leading exponent of this method of teaching, the so-called modern type or the clinical application of pathology on the North American continent. He has long been noted for that. As a matter of fact, three or four years ago, when his book came out, we seized it at once and stated, "Here is the first time we have a textbook in pathology that is, in our opinion, written with the proper viewpoint." It was presented from the standpoint of the correlation of the patient's symptoms and the pathological findings.

It is perfectly obvious that the type of pathology taught will depend almost entirely on the teacher. It follows, then, that the pathologist, of necessity, must be a clinician. The pathologist who is isolated and does not have clinical contact would not be able to give the kind of course Dr. Boyd has described. Therefore, it is imperative, in my opinion, that the pathologist in all of our medical schools should have constant, daily clinical contacts. It goes back to the old saying that the pathologist who never goes to the bedside is equally as ignorant as the clinician who never comes to the microscope, and the pathologist who gives the kind of course Dr. Boyd teaches must be a clinician as well as a pathologist.

For the past few years, at Emory University, we have attempted to carry out this same plan of teaching, except that we have not accentuated the museum feature. We have done this more with case histories, with records from the university hospital. It is seldom that we open a lecture in pathology that we do not have on the desk before us one or two records, case histories from the hospital, in order to emphasize the importance of the pathological findings as applied to the general practice of medicine. It serves this important purpose, it seems to me: When students are taking this work in the second year of medicine, it serves not only the purpose of correlating the clinical findings and pathological findings, but it impresses on them the important fact that the work they are taking in pathology at that time is not an isolated, purely academic subject without practical application. It serves to emphasize that the work they are learning then will be of importance to them in the diagnosis and treatment of disease. That is especially true in a medical school where the first two years are divided from the second two years, as at Emory University. Therefore, Dr. Boyd's method is an important advance in the teaching of pathology.

DR. EDWARD S. THORPE, JR. (University of Pennsylvania): Another humble admirer of Dr. Boyd's teaching method expresses the appreciation of this Association for this remarkable presentation of a pedagogical system. It is perfectly evident to every one of us that Dr. Boyd is teaching not only pathology but the whole subject of medicine. It is equally evident that he resembles one of the early founders of American medical education, in that he occupies not only a chair but a whole settee.

DR. L. R. CHANDLER (Stanford University): We have been milling over in our minds for three years now, since Dr. William Ophüls passed away, the methods of teaching pathology. Last week, after our men had worked for several months on what they wanted to do and how they wanted to do it, we transferred Dr. William Dock from the department of medicine to the department of pathology, where we already had three younger men of Ophüls' training. We will see how this works.

DR. WILLIAM BOYD: I find it impossible to express to you adequately my appreciation of the kind things you have said. At this meeting I feel like a country cousin visiting the city, so that I cannot find suitable words. All I can say is that I thank you very, very much.

## The Integration of Clinical Medicine with the Preclinical Sciences\*

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I think it may be taken as a truism that the majority of young men and women who enter medical school do so with the intention of eventually pursuing the practice of medicine. The reasons which prompt them to this end are undoubtedly manifold; but, in the final analysis, they are most influenced to do so as it seems a respectable and pleasant way of making a living. In other words, it is primarily a means to this end. In fact, it is but reasonable that this plays a part in all instances. It could hardly be expected to be otherwise as few would have sufficient personal experience to induce them to enter this profession through pure love of it. They might have some inkling through their fathers or uncles, or men they have admired or been intimately associated with, having been doctors. On the other hand, they may have been dazzled by the glamorous reputation of a local specialist; or, it may be that they had discovered that the local general practitioners of medicine as a rule commanded a social prestige and also a certain financial success.

A few enter on the study of medicine through pure love of pursuing a biological science. These have usually a fairly definite idea of how they should prepare themselves for their objective and, as a consequence, during their undergraduate years at college they so construct their course as to lay a broad biological and chemophysical foundation on which to build the more particular studies which they will pursue through their medical career. To these students the study of anatomy, physiology and biochemistry is an intellectual joy, and they are even more exhilarated when they enter on the intricate and often uncharted seas of pathology, immunology and scientific medicine. They readily appreciate that without the training which biology and physiology in their broadest conceptions afford, it would be impossible to comprehend intelligently the abnormalities of structure and function which is medicine. But these individuals are comparatively few in number.

The majority who approach their medical studies with an utilitarian objectiveness naturally think of the individual patient and his illness as the important goal. Therefore, they are inclined to find the meticulous study of anatomy, physiology and biochemistry rather boring, and they are impatient, as they think their study a waste of time. They do not, at this period, appreciate that without knowing the normal they cannot properly understand the abnormal; that, in time, they will be experts, and that unless they understand the fundamentals whereby the human organism is so co-ordinated and united to accomplish

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the objects of living and reproduction, and also appreciate its beautiful resiliency and capacity for adaptation to changes of the internal and external environment, they cannot understand disease processes.

There are a number of ways in which this important educational conception may be placed within the comprehension of the average student. The present method of constructing our medical curricula does not conspire to accomplish this end in a satisfactory manner. Our curricula have developed through the centuries in a rather haphazard and opportunist fashion. As we view this progress, I think it is obvious that anatomy was the parent subject from which most of the academic departments, as we now view them, have either directly or indirectly sprung. Many of you will recall the birth of modern English physiology that arose from the inspiration of the anatomist Sharpey; how his two students, Michael Foster and Burdon Sanderson, respectively, were called to Cambridge and Oxford to the newly established chairs of physiology. Burdon Sanderson later became regius professor of medicine at Oxford, while Michael Foster continued in his chosen field and sent from his department in succeeding generations such men as Schafer, Langley, Starling and Bayliss. The influence of this school spread to the continent, and, shortly, there came into being the school of physiological or biological chemistry under the inspiration and guidance of Hoppe-Seyler, von Liebig, Fischer and others. Later, pharmacology arose from a fusion of physiology and chemistry. Anatomy, in the meantime, pursued its steady course, the influence of the great Edinburgh school of the Munroes even today largely dominating its tradition.

Histology has often been an unwanted orphan, although it was through histology that Sharpey created his school of physiology. Anthropology is now coming into its own, but for years it was considered too erudite or inconsequential for the medical curriculum. Pathology of the Virchow tradition has blazed a trail of its own. It is true that in the nineties, largely through the teaching of Osler, it occupied a preeminent place in the teaching of medicine. Its principal shortcoming was that it tended to make medicine too static and did not permit of much hope for successful therapy.

As the decades passed and each one of these separate subjects grew into adult form, they demanded a place unto themselves as individual sciences. We are not unmindful that with some justice they thought our methods antiquated and looked askance at what they considered the unscientific manner of the practice of medicine. It has often been stated that such and such of these departments must teach their science without respect to the ultimate use which the student might find for it in his life's work. They usually failed to appreciate, and if they did so it was with scant courtesy, that those who desired to travel the road to practice medicine had to pass through their gates on the way whether they liked it or not and had to pay tribute. They also failed to appreciate that their existence largely depended on the medical student's compulsory attendance and payment of fees.

Now, these may be hard words, but there is much truth in them. It is a very laudable ideal to teach physiology, biochemistry, pharmacology or pathology as a

pure science without respect to their future applications in medicine which many who hold this view think has little science about it. With this latter opinion I disagree entirely. Furthermore, the student also often disagrees with a sullenness and resentment which is not conducive to the appreciation of the importance of these subjects, nor to a desire and willingness to master them.

The fault has not altogether been justifiably laid on the doorstep of these advocates. It can with equal justice be asked, "To what extent has the teacher of medicine or surgery or gynecology and obstetrics employed the knowledge, language and technique of these subjects in the teaching of his own subject?" It is of little future use for one to blame the other for the faults of the past, particularly as the problem is easier of criticism than of solution. Nor is a ready answer to be found unless there be a desire on the part of all teachers to coordinate and cooperate. There are, however, to my mind, certain primary principles which should be accepted.

The first of these is to introduce the student to the sick person as early in his curriculum as possible. The interpretation of the function of "possible" will vary considerably in different minds. It might mean the first week of the medical student's first year, or it might be deferred, as at present, to the end of his second or the beginning of his third year. The latter is the traditional interpretation; the former is almost mine. And this should be done by one who is primarily identified with the clinical subjects as the symbolism will represent to the student, although the facts may seem beyond his comprehension that anatomy, physiology and biochemistry, and, later, pharmacology and pathology, are absolute necessities in the understanding and treatment of the sick person while he is still alive. The day is past when a meticulous anatomic diagnosis, confirmed on the postmortem table, is the cherished ambition of every physician. This may be good for the physician but it is cold comfort for the cadaver. Derangements of function and their correction during life, whether they be due to anatomic, physiologic or biochemical perversions, are his principal duties, and unless he can appreciate the fine graduation between the normal and the abnormal in the earliest stages he cannot succeed in these. I estimate the conception of this intimate association to be so important that I believe it to be of advantage not only to the students but to the teachers by way of developing a science of medicine—and I believe there is one—that the student should be introduced to the patient before the end of the first month of his medical studies. I would not delay it longer as from now on all subjects should follow a parallel course.

The coordination and integration of the preclinical sciences with the more practical subjects might be accomplished by one of two methods, the essential difference resting on whether medicine, surgery or obstetrics would do this in cooperation or independently. The following may elucidate this. Take, for instance, that a clinical lecture is given by a clinician once or twice a week to demonstrate the application of physiology to disease as, for instance, the physiology of blood formation and destruction, and their relation to anemias, and so on. Clinical lectures could, quite usefully, be given with patients as a text, until the whole course of physiology had been completed. But, if similar clinical

lectures had to be given quite independently, dealing with anatomical or biochemical defects, and these, in the future, be repeated in correlation with pathology, it would lead to a cumbersome, if not actually chaotic situation.

It has been our custom for me to give a clinical lecture once a week to the first year students, demonstrating cases which by their symptomatology or appearance throw into relief the importance of knowing the normal physiology of the system or systems concerned. This has given considerable stimulus to the student and has undoubtedly increased his interest in physiology and biochemistry as it demonstrates their application to his life's work. This has not only been recognizable through his increased interest but also in the higher standing of the students at their examinations in physiology as well as their subsequent application at the bedside. But this, to my mind, does not go far enough. Physiology and biochemistry may be taught as separate sciences. With this I have no disagreement as probably I do not know enough about it; but, as far as the human animal is concerned, he is both a physiological as well as a biochemical complexity whether this be during health or illness. The same may be said of anatomy, anthropology, embryology and histology. Their study by the medical student—although they lend themselves to form part of a liberal education—is of primary value to them because in the future they are to help him in his life's work.

A proper integration of all these subjects toward themselves as well as toward medicine, surgery and obstetrics, is the ideal to be attained. That it is difficult to bring about this cooperation and integration is well exemplified by the disagreement which occurred some years ago as to whether histology should form an integral part of anatomy or of physiology. The School of Physiology founded by Sharpey claimed that histology should belong to this subject, which was but natural as their master had become intrigued with the study of function through histologic methods. The anatomists, on the other hand, claimed that histology dealt with the microscopic structure of tissues and was, therefore, an essential of anatomy.

The controversy to my mind was without substance as histologic methods are applicable and, indeed, form an essential part of other sciences and are a technique rather than a separate subject. To the medical student, however, this splitting of the animal organism into different departments or compartments is a fruitful source of confusion of mind. Is it not possible for these sciences to maintain their individuality as far as the purely scientific aspect is concerned but at the same time to cooperate with each other for a common purpose in teaching medical students? Instead of their being taught in a detached manner, one from the other, could it not be arranged that the anatomy, physiology, histology, biochemistry and pathology of respiration, both in health and disease, be considered as an entity, each science contributing its part in a coordinated whole? Medicine would likewise cooperate and through the integration of properly arranged and conducted lectures, clinical theatre demonstrations, or bedside classes make objective by demonstration how the anatomic, physiologic and biochemical processes are diverted from the normal in disease. For the

medical student it would make these subjects live, and at the same time it would have a salutary effect not only on the teaching but also on the practice of medicine. It would make it more critical and accurate and at the same time would be productive of more cooperative research. The pursuit of truth for its own sake is ever laudable but it often happens that biological truth, as far as medicine is concerned, is born with a cowl and it may take twenty or thirty years before it can free itself.

I do not think that such a method of teaching medicine is impossible. No one is more conscious of the difficulties than I am but I believe that these difficulties are those of tradition and there is probably no body of men which is so jealous of tradition as we are. Any change in the traditional method of teaching is usually considered heretical.

I have not mentioned the integration of obstetrics in this cooperation. After all, childbirth is a normal biologic process. It is true that a certain small percentage of cases are abnormal, but it would be an excellent stimulus to the teaching and practice of obstetrics if the subject were brought more intimately into contact with the current teachings of reproductive physiology, biochemistry, endocrinology and pathology, not to mention the more modern conceptions of bacteriology and immunity.

Similarly, I have not mentioned surgery in this integration, and with all due apologies to my surgical colleagues, I maintain that operative surgery is a branch of therapeutics. Since my student days it has been difficult for me to believe or to accept that there is a surgical and a medical aspect of disease or diseases. Their diagnosis and treatment are too often determined by the admitting officer in a large hospital. Let me explain.

An individual presents himself at an outdoor clinic, or is sent to the admitting office of a hospital with a belly ache. He has had this on and off for many months. He may with equal chances be admitted either to a medical or a surgical ward. A diagnosis of duodenal ulcer is made. It would not be disputed by anyone that if he is admitted to the surgical ward he will most likely be operated on; if to a medical ward, he will be placed on a rather tedious but no less efficacious dietary regimen of a variant character. In the majority of cases he will recover, or think he has recovered, by either process, but it cannot be claimed with any degree of scientific directness that two such opposite and, one might almost say, antagonistic methods of therapy could have conducted him to the common goal. One or other, and probably both, were wrong, and the individual recovered in spite of either.

But this is not all. There are strong partisans of the surgical school and even stronger, if possible, advocates of the medical school of therapeutics for this disease. Both sometimes have the bad manners, and worse grace, of jeering at their colleagues behind their backs but in front of the students. But what of the poor student? Whom is he to believe? Where lies the truth, is his constant question. He is probably the most scientific of the three parties as the others follow the therapeutic dogma of his specialty, while the student, appreciating

that a positive and a negative, or two opposites, cannot both be right, loses faith or is driven into a wilderness of doubt and confusion.

This is a result of our antiquated methods of admitting patients to hospitals where students are taught. The individual patient should be admitted, to my mind, to a ward where he will be examined as a human being and not as a medical or surgical, otolaryngological, gynecological or some other kind of case. With the greatest expedition and cooperation of all available and necessary talent his illness is elucidated, and this, I contend, would be accomplished with a fair degree of scientific accuracy. The proper treatment indicated in each particular case should be agreed on, after the pros and cons have been balanced. He would, then, be transferred to a ward where this could best be carried out and a scientific critical judgment reserved as to its benefit or otherwise. In such an intellectual environment the student would grow up steeped in an atmosphere of humanism and science.

It has often been stated that there is an art as well as a science in medicine. I can only agree to this up to a certain point. The scientific part of medicine chiefly rests in an accurate elucidation of perverted structure and function. The art is in therapeutics. I do not mean to imply that treatment may not be scientific. In fact, the past thirty years have produced with increasing frequency highly scientific therapeutic procedures, for instance, the treatment of myxedema by thyroid medication, the removal of parathyroid tumors or hyperplastic glands for disordered calcium metabolism, the treatment of pernicious anemia with gastric and hepatic extracts, insulin in the treatment of diabetes, antidiaphoretic serum, and a host of others. These therapeutic measures can all be carried out with almost mathematical accuracy, but a much greater part of therapeutics is speculative, traditional, charlatanish and often superstitious.

In order to overcome this chaos inherent in the separate teaching of much of medicine and surgery, there was instituted in Edinburgh University some years ago a cooperative effort in which the physicians, surgeons, pathologists and, to an important but lesser degree, other departments of the faculty taught different aspects to the same group of diseases at the same time. For example, again let us take peptic ulcer. The pathologists lectured on the pathology, the physician on the symptomatology and diagnosis which, after all, is the same whether the victim falls into the hands of a physician or a surgeon. The radiologist gave his contribution; the surgeon lectured on the important complications, the majority of which require surgical treatment, and there was adopted a common and agreed on process of treatment which could be taught with equal propriety by either the physician or the surgeon, but the latter, as would be expected, dealt with surgical technique and anatomy when such procedures were indicated. This method benefited both the students and the teachers.

The confusion in the students' minds is not, primarily, created by doubts as to the pathology or as to the diagnosis of any abnormal process, but by the confusion in classifications and in treatment. This confusion is further accentuated by learning a language and a manner of thought in physiology, anatomy, bio-

chemistry, pharmacology and pathology, which seems to have but little place when he is launched into the study and practice of medicine, surgery and obstetrics. It is not that the knowledge which he has acquired is without value, but it is not put to work by his teachers in these latter subjects.

Although such cooperation is a step in the right direction, it does not go far enough. The student is still taught most of his subjects in a disjointed manner. There is no relation one to the other, nor is the same sequence attempted in the development of each subject. He is given a jumble of facts, ideas and thought out of which he is supposed, eventually, to reconstruct a picture puzzle in which many parts are missing. He will have neither the time nor the capacity to do this, as constantly there are being thrown on the table new parts or pieces which change its configuration, or throw into relief brilliant colors which previously seemed to be dull shadows, or the contrary may occur.

I believe there is an approach through which these defects in medical teaching can largely be corrected. It must be taken as a primary premise that the teaching of medicine should be directed to view the human animal as a whole with two fundamental destinies, self-preservation and self-propagation, and these should be carried out with a happiness and comfort of mind and body equivalent to, if not even greater than, that enjoyed by other animals. When this is not the case, then the human animal is sick, abnormal, pathological, or has a disease, call it what you please, and he goes to the physician for advice as to its correction.

Now it must be appreciated that man is a complete animal composed of a number of systems and parts which are beautifully and delicately coordinated, and which maintain a rhythm called life. Most of these can be seen, felt or heard, and can be watched directly or indirectly in the performance of their various functions and the interplay, one on the other and with the others. They cannot best be appreciated or understood when they are viewed or approached by separate or isolated methods, techniques or in subjects. This is the state into which the teaching of medicine has developed. Man is considered as a conglomeration of subjects, not as a living, loving, fighting animal in whom embryology, anthropology, anatomy, physiology and biochemistry have all conspired to make him what he is—each in its different manner but all to the same end. And when he is ill, a system has wandered from the ordered path of health, alone or at the same time has caused incoordination or disorder in others.

I can visualize a school of medicine which will adopt a curriculum where the teaching of medicine will be approached and developed by systems instead of by subjects. As a start must be made somewhere, and as the anatomist is most dependent on his material, this would be with the surface of the body or the skin, the most obvious of our systems but probably the one about which least is known. The anthropology, anatomy, histology, physiology, biochemistry and pathology of the skin and sweat could be studied at the same time. A great deal of this is capable of visual demonstration and simple experiment on man. Among these could be included nervous control of the sweat glands, surface circulation, capillaries, sensation, nerve terminals and a host of other funda-

mental conceptions. When one stops to think of it, there are few better situations to study inflammation and new growths than in the skin. At this time, dermatological lesions, which are obvious, would also be demonstrated and could be used as examples of simple but fundamental processes. Where could syphilis be taught better or the principles of allergy?

The next group of tissues would naturally be the muscles, ligaments, bones and joints. They would be considered from a structural as well as a functional-anatomical point of view. The biochemistry of muscle physiology, with consideration of carbohydrate, protein and fat metabolism, the distribution and function of the peripheral nerves would give great scope to the neurologist, while the surgeon would deal with fractures and dislocations, and the orthopedist would also have his place. Visceral systems and organs would, in time, be considered—such as digestion, circulation, with the blood, both arterial and venous, and lymph, their normal and pathological constituents, and the effects of impaired circulation and its control. I see no reason why it would be illogical to consider the cellular aspects or the ultimate purposes of the circulation, respiration and metabolism, before dealing with food intake, digestion, pulmonary respiration and cardiac physiology. In fact, it might be a much better way to explain the production of symptoms, which, after all, are the first manifestations of disease, rather than consider gross abnormalities of the internal organs to the relative exclusion of those finer processes inherent in cellular function.

It is not my purpose to develop this thesis to its ultimate details as time could not possibly permit; but, I wish to emphasize the point that the study of structure and function, both normal and abnormal, should be pursued together to the final end of knowing and understanding man both in health and disease. Anatomy and physiology would not be first year subjects nor medicine and surgery final year subjects. They would all start together and end together. The coordination of the study and investigation of disease would, in time, dominate the picture, but not to the exclusion of the normal or average limits of function and structure. Otherwise it would be an edifice without foundations.

This conception of the teaching of medicine may seem to you bizarre and heretical; but, there has been much searching of heart in the body medical of how the teaching of this subject might be brought into line with its practice. The traditional and orthodox methods have been followed with many an amputation here and a graft there, but still the same old skeleton has been expected to maintain its life and vigor. It is too much to ask of a centenarian. I am bold enough to believe that the medical faculty which first adopts such a general plan for their curriculum will blaze a trail which all will eventually be forced to follow. It will be sound pedagogy and will make the study of medicine a liberal education and foster its scientific ideals. Science is a manner of thought rather than of deeds.

## The Value and Need of Coordination in the Teaching of Surgery\*

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Increased specialization and greater scientific activities of various departments of medical schools are becoming more marked from year to year, necessitating closer correlation between the various departments of teaching institutions. It is not difficult to see how the medical student will be completely lost on an uncharted sea if each individual department in the medical school stresses only its particular branch without any integration with other subjects. It is often difficult for him to realize that the same disease process described by the pathologist is treated conservatively by the internist and operatively by the surgeon. During the time of preceptor medicine, correlation between various departments was not necessary because there was no rigid division of diseases. The patient was studied and treated by the preceptor and the pupil without making any particular attempt to determine whether the condition was medical, surgical or psychiatric. Today, however, because of the great fund of knowledge and necessity that the student familiarize himself with the bare essentials, it has become necessary to divide the curriculum into many highly specialized departments in order that the maximum amount of basic information can be obtained. Unless there is close cooperation between the various teaching departments and correlation in the different subjects, confusion and misconception are likely to result. Also in various departments there is frequently useless repetition of the same or similar phases of a subject which if eliminated would allow the student more time for additional work. Marriott<sup>1</sup> aptly states: "The medical curriculum should, from the beginning, be unified and coordinated with the central idea of imparting a knowledge of man himself as a complete individual, his growth, development, functional activity, and reaction to environment."

Although a knowledge of anatomic make-up of the body is essential for any one to practice medicine, and although the study of anatomy alone for anatomy's sake may be an excellent mental exercise, it cannot be doubted that occasional reference by the anatomist to the clinical significance of anatomic findings will be helpful. In a consideration of the inguinal region, the possibility of inguinal hernia with its manifestations, demonstrates to the student the inestimable, practical value of this fundamental science. Similarly, the description of typical deformities produced by muscular pulls in fractures is of interest to the student during his anatomical studies and of great value to him subsequently when he sees fracture cases in the clinic. It is for this reason that in the department of

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1. Marriott: Unification of the medical curriculum. *Southern M. J.*, 29:927, 1936.

anatomy at Tulane University there is always a clinical instructor, usually a surgeon, who emphasizes the clinical importance of anatomic anomalies and structures. Dr. Wilbur Smith<sup>2</sup>, professor of gross anatomy at Tulane, states: "So little gross anatomy is retained by the students that I think the application of surgery to certain parts is most effective in impressing these parts of the body upon the mind of the student. The action of the various muscles in fractures is of tremendous interest to students. The lymphatic drainage of a part or organ, so frequently the seat of carcinoma, usually interests the student. In applying medicine and physical diagnosis, the external markings of the various organs on members of the class seem to materially stimulate the interest of the student in the subject. Certainly, the application of any clinical subjects in the teaching of gross anatomy is beneficial and I feel certain that students are better able to retain it longer by embodying clinical medicine where possible rather than through strictly routine teaching."

In addition to this, various members of the clinical staff address classes in anatomy on clinical subjects which are more or less directly related to anatomy. This, as emphasized by Garrey<sup>3</sup> in Leathers'<sup>4</sup> excellent presentation before this Association, exerts a definite psychological effect on the student in that it demonstrates to him that anatomy is of distinct importance to the busy clinician and that it is not merely a hurdle which a student must clear before he can begin the study of the practical side of medicine. The same correlation is necessary between every department of a medical school. It is equally as important for the clinician to correlate the preclinical sciences with his clinical teaching. The necessity of this integration is probably more obvious than the correlation during the preclinical years, because, certainly, a clinician must be well founded in physiology, pathology and anatomy. Indeed, no clinical condition can be considered adequately without a review of the morbid anatomy, disturbed physiology and biochemical changes. Whereas, previously surgery precluded, principally, a knowledge of anatomy and pathology, today, because of the great advances made in biochemistry, physiology and bacteriology, frequent reference to these subjects during the course in surgery is necessary. The preoperative and postoperative treatment used by surgeons today is no longer empiric; it is physiologic, and is based on laboratory experimentation. Because of the close correlation between the surgical and physiologic groups, the present day surgeon is not only an anatomist and pathologist, but also a physiologist and biochemist. Many surgical departments have large bacteriologic divisions and in these divisions great contributions to the knowledge of surgical infections, particularly the anaerobic ones, have been made.

Although few teachers will deny the logic of correlation between preclinical and clinical subjects, there are many who are not convinced of the desirability of integration of the clinical subjects. I am convinced from experience gained at the University of Wisconsin that such correlation is not only logical but even

2. Smith, Wilbur C.: Personal communication.

3. Garrey, Walter E.: Quoted by Leathers; Reference No. 4.

4. Leathers, W. S.: Correlation of departmental activities in the instruction of medical students, *J. Assoc. Am. Med. Coll.*, 10:73, 1935.

necessary. This system not only saves considerable time for the student, but also correlates the various phases of medicine in a particular case. According to the plan the disease condition is considered primarily, the various phases of the condition being presented in chronological order by the individual departments. As an example, the subject of anemia is discussed by representatives of several departments as follows: Four hours are given by an internist on the general subject of anemias; the fifth hour is devoted by the surgeon to the subject of transfusion and blood matching. Two one hour lectures on leukemia are presented by an internist and two hours by the neuropsychiatrist on cord degeneration. Following this, the internist lectures for an hour on neutropenia, after which the obstetrician discusses the blood in pregnancy. Thus the immature undergraduate obtains a true conception of the condition and correctly understands the various phases of the problem.

Similarly, subjects which may require either medical or surgical treatment, such as peptic ulcer, thyroid disease and many others, are considered. In this way, considerable repetition is obviated, because the etiology, pathology and clinical manifestations are not discussed separately by the individual departments. Of even greater importance is the fact that the student does not get the erroneous conception that the peptic ulcer treated surgically is not the same as that treated medically. Marriott<sup>1</sup> sagaciously states, "Each separate subject should be taught in the relation to the whole, not as an isolated branch of knowledge."

As regards bedside teaching, there is probably less necessity of correlation between different departments than in didactic lectures, because, presumably, every patient seen should be worked up completely whether he or she is seen on the pediatric, urologic, medical or surgical service. Although a cardiac murmur is detected in a surgical case and, although it is highly desirable in such an instance to secure the opinion of a cardiologist, there is no reason why that murmur cannot be studied on the surgical service. With the increase in medical specialization and the further subdivision of medical branches, the need for correlation of the teaching performed by various departments becomes proportionately greater.

#### DISCUSSION

DR. WILLIAM S. MIDDLETON (University of Wisconsin): We are intensely interested in the subject of the integration of clinical courses and the correlation between clinical and preclinical subjects. As Dr. Ochsner has kindly stated, his first contact with the integration of clinical subjects came in Wisconsin where, since the inception of our course in the clinical subjects eleven years ago, we have attempted to correlate and to orient the student in relation, first, to his basal sciences, initiating the combined practice of medicine and surgery by a series of lectures on pathologic physiology. This is a simple course of twelve lectures with the sole thought of capitalizing symptomatology under the head of disturbed physiology. Given by the members of the preclinical staff, in the main, we consider this introductory course important in bringing up to date the student's general conception of symptoms as dependent on disordered physiology.

Then, as Dr. Ochsner has pointed out, there is the important orientation from fundamentals by way of the developmental disturbances from the standpoint of the pediatri-

cian, disturbed nutrition in the child, and then starting off with such disorders of the biochemistry in the adult as acidosis and alkalosis, we proceed to the diseases of metabolism and carry that thought forward into the field of medicine by regular steps and orientation among the several divisions of disease as we find them clinically expressed, the whole idea being, as already stated, that we wish the student to think of the subject of disease as a unit. The individual, as a sick person, presents himself to the physician not as a case of peptic ulcer, but rather as a patient who should be approached from the broad, general principles of disturbed physiology, pathology and clinical medicine.

When we come to a subject like pneumonia, for example, we consider it illogical to treat the disease abstractly without some background of the pathologic physiology of cyanosis and of dyspnea; and then the internist considers the broad, general principles of pneumonia. Finally, rather than waiting two or three months and considering empyema and lung abscess as isolated entities, the surgeon takes up the treatment of complications after the uncomplicated course has been considered by the internist.

The impression grows that the student has taken from this particular integration the idea of the subject as a whole, and we hope to bring to him not the detailed information of an isolated subject, but rather a technique in approach that starts from the fundamental sciences and carries through his study of disease. We feel this has been successful in the attitude of our men toward their patients, first from the humanitarian and then from the purely scientific standpoint.

The idea of carrying backward this particular phase of development into the pre-clinical sciences was interesting, because we found our confreres were rather jealous of their time and their prerogatives. Three years ago, I was struck by the fact that the medical students became a little stale in their bacteriology. They had a fine course under Professor Clark, an excellent teacher, but they had gone stale, and the science was so abstract that in their opinion there could be no application. I asked Professor Clark if I might present cases of a clinical order that were applicable to the subject under study in his course. Accordingly, we brought to the students a patient with pulmonary tuberculosis, at the conclusion of their consideration of the tubercle bacillus, broncho pneumonia, typhoid fever and other subjects were similarly handled. Only ten or fifteen minutes were devoted to the clinical phases of subjects related to the etiologic factors.

From bacteriology the plan has expanded through the effort and cooperation of other individual professors or heads of departments who have desired the same coordination. This plan is, of course, feasible in physiology. It has also been carried into anatomy and neurology, particularly where the student may observe a patient with disturbed gait, disturbed reflexes or sensation under conditions pathological to the patient which will give rise to these changes. To date, we feel it has been particularly helpful in pathology and bacteriology.

I am reminded of an experience Dr. Welch had with Dr. James Mackenzie. Dr. Mackenzie said: "You have made a terrible mistake in the matter of the instruction of students." "In what respect, Dr. Mackenzie?" "You have taken the students out of the clinical wards, out of their contact with patients, and put them in the laboratory." Dr. Welch said, "I plead guilty to that offense. Have you had any personal experience with this particular scheme?" Dr. Mackenzie answered, "Yes. As a student, I was under exactly the same influence. We were taken out of the wards and put in the laboratory, and the result of it was that we came out of the medical school knowing nothing about medicine." And Dr. Welch retorted, "And you knew that you knew nothing about medicine." "Yes." "You wanted to know more?" "Yes," "That is the best course of medicine I have yet heard of."

So, in Wisconsin, we rather hope to develop a technique in clinical medicine, and from this foundation the student will thereafter develop as a practitioner.

## Medical Education: How to Choose It and What It Offers\*

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The premedical student has been content to play a passive rôle too long. Because tonight I have the privilege of addressing a student group which has demonstrated its ability to excel, I welcome the opportunity of telling a figurative "dummy" what "its rights" are.

Several large industrial organizations send out scouts to interview and recruit the most promising members of the annual crop of college graduates. They do this in order to assure themselves of an adequate "reservoir of competent man-power" for research and management—a reservoir as important as is the supply of physical raw material. The approved medical schools are in the enviable position of being able to select their candidates from a supply excellent in quality and greatly in excess of what can be absorbed usefully. Their entrants, therefore, represent a highly selected group—a group selected on a composite basis of scholarship, character and aptitude. Premedical training is censored both as to quality and as to quantity. The requirements calculated to make for a successful medical career—except for minor refinements still to be ascertained—are generally agreed upon by leaders in medical education. In this respect the premedical student is something of the underdog, no doubt to his ultimate benefit. However, the other side of the contract—for medical education is indeed a contract between university and student—has not been emphasized to nearly the same degree. Here it seems pertinent to inquire into the reasons which impel so many students each year to seek a medical education. In any one individual the urge to study medicine may be the resultant of several factors. These are subject to analysis:

**FAMILY TRADITION:** This affords an interesting sidelight into the vagaries of human nature and the strong grip medicine exerts on her disciples. Rare is the doctor who openly and purposefully would condition his child to follow in his professional footsteps. All too aware of the exacting educational requirements, of the extraordinarily keen undergraduate and graduate competition, of the long and arduous struggle for economic security, of the exhausting, unending demands of the public on his mental and physical faculties, a doctor is loathe to advise a similar ordeal for his child. Yet, year after year, a fair percentage of the medical student population is composed of children or close relatives of physicians.

\*An address delivered at the annual banquet meeting of Sigma Alpha, honorary premedical student society, May 29, 1936.

On the part of the parent this is, perhaps, due to the desire that his child, too, may belong to an honorable profession. Or he realizes the advantageous position of a child in a position to profit from the parent's experience. In bygone days, a similar motive moved certain craftsmen to establish a family tradition for skill. On the part of the child it is, perhaps, due to environmental factors, perhaps also to the imitative instinct. The child is unaware of the anxiety and drudgery of a doctor's life, of the interruptions which so often disrupt household routine and family plans. He is much more impressed by the fact that as the child of a highly respected member of the community he shares to some extent the privileges accorded his father. Nor can he help but be impressed by his dad's knowledge, assurance and kindly tolerance.

**IDEALISM:** Anyone reared in a community served by one of the "old type" general practitioners almost inevitably developed a deep respect and sincere admiration for the industrious, kindly doctor, friend alike of rich and poor, old and young. This was especially true of the general practitioner of a generation ago and notably so in rural communities. The village doctor enjoyed the glamor shared today by "G men," sport celebrities, screen and baseball stars. Many a promising young medico was first inoculated with the germ of wishing to be a doctor because of early association with his family physician. Today, a less personal idealism is fostered by newspapers and magazines featuring spectacular operations and new remedies. This idealism, combined with industry and enthusiasm, is a most desirable trait; properly nursed, it does much to relieve the trials and tribulations of a doctor's career. As more mature years are reached, hero worship is gradually replaced by an idealism of service which, in the rightly constituted individual, is never wholly destroyed by stark realism. Unfortunately, altruistic idealism also operates to the physician's disadvantage—all too often an ungrateful clientele behaves as if service is its own reward, not requiring such material recognition as prompt settlement of fees for services rendered.

**SOCIAL PRESTIGE:** As an honored member of the group of "learned professions," medicine justifiably confers a certain prestige on her disciples. Mere desire to attain social promotion, however, never justifies the choice of medicine as a career. It is a selfish motive and one to be deplored. Should any considerable body of the profession be activated by this motive, medicine would soon lose the very prestige these men seek. A poor physician made at the expense of a good bricklayer is a serious economic mistake for the individual and his community. A competent laborer has something denied a mediocre physician—the respect of his community.

**ECONOMIC SECURITY:** It is a cruel jest—largely contributed to and perpetrated by the profession—which forces a doctor to present an outward

appearance, if not of affluence, at least of economic comfort—a picture all too often unwarranted by fact. The exigencies of the profession demand a high standard of presentability. A doctor is expected to take an active part in civic affairs and community projects. This creates an impression of financial comfort. The other side of the picture—upkeep of expensive office equipment and efficient means of transportation, purchase of costly textbooks which soon become obsolete, attendance at scientific sessions, postgraduate instruction—is not seen by the public. A doctor has a high overhead expenditure. Add to this the fact that he is looked on as legitimate game by salesmen of every description and it is evident that he is prey to more than his fair share of economic hazard. Actually, when it is considered that the M. D. degree is attained only after seven years of expensive college education and one or two years of intern training with maintenance as sole compensation, and that the owner of the degree then still faces years of struggle to attain a position simulating comfort, it is readily evident that a similar expenditure of mental effort and labor in almost any other field is bound to be attended by economic fruit earlier and greatly in excess of what is in store for the average physician. Even during pre-depression boom years, well trained physicians were freely advertised for at salaries only a fraction of those available to men of similar calibre and equivalent training in business fields. The long apprenticeship necessitated by a medical education on the average also entails the additional hardship of late marriage.

The ultimate career of the individual physician is partly determined by the force exerted by each of these various factors, to which, perhaps, may be added that of intellectual curiosity. From the student's viewpoint, however, there are three problems concerned with medical education and these, too, play an important part in shaping his career. These are:

1. How should the student choose a school?
2. What may he demand from the faculty entrusted with his education?
3. What may he look for from the profession of his choice?

How should the student choose his school? Since the student is finally selected from a field almost twice as large as can be accommodated, it is only proper that he should select his Alma Mater with care and foresight. That this does not always hold true is revealed by the fact that in 1935 only about 60 per cent of the applicants for (medical) matriculation made single applications, prepared to stand or fall by the result.<sup>1</sup> The same year, 625 each applied for entry to ten or more schools, one making 36 separate applications. What an example of inconsistency is afforded by these facts and study of the way in which the average student selects a particular school.

Seldom so fortunately placed as to be able to exercise real discrimination in his selection, the premedical student turns to physician relative or

physician friend for advice. Advice from this source, colored by loyalty to alma mater, may not be wholly unprejudiced. Often without consultation of graduates of other schools or considered weighing of the relative merits of rival schools, having satisfied himself only that he is able to comply with the entrance requirements, the student blithely applies to ..... University, to embark on a long and costly education! And so we have the anomaly of the farmer who debates long before investing in a horse having a market value of a few hundred dollars, of the banker who makes many careful inquiries before buying a contemplated stock, of the merchant who certainly "investigates all three" before buying even the cheapest car, investing four years and several thousand dollars in the education of his child, solely on the recommendation of a relative or friend. This is the more reprehensible when it is borne in mind that an unsound horse or a poor stock still has some market value, that a car is guaranteed as to material and workmanship, while an inferior education places its recipient at a permanent disadvantage.

It is true that the student is protected to some extent by the Council on Medical Education which appraises and grades the medical schools. But a student may enter an approved medical school and find it placed on probation by the Council, before he has completed his studies. If he then transfers to another school, he is under the handicap of having to make new environmental and curricular adjustments. Three approved medical schools have been demoted since 1933.<sup>2</sup> Furthermore, in 1935, 678 candidates for medical registration (8.5 per cent of the total) had graduated from schools not on the approved list. Obviously, schools unable or unwilling to comply with the minimum requirements imposed by the Council on Medical Education, would be forced to close or revise their standards upward if premedical students kept themselves informed of the status of these schools and refrained from applying to the inferior schools for registration.

How may the student safeguard himself? First, the student must make it his business to complete his premedical studies with sufficient credit to be able to conform to the requirements of even the most exacting medical school. Second, it is well to keep in mind that there are two general fields open to the medical graduate—the field of active practice and the field of teaching and research. Occasionally, they may be combined. Only the exceptional premedical student can determine, so early in his career, which of these two general fields he most desires to enter. Such students, however, are in a distinctly advantageous position since inquiry will reveal that some institutions carry a high reputation for training and placing their graduates in research and teaching fields, others an equally sound reputation for turning out well trained clinicians. At least, the prospective student can examine the records of a school and determine its "batting average"—whether its good batting average is predicated on a sustained

succession of hits, on success earned during a long passed generation or on an increasing percentage of successful recent graduates. Nor should a school be selected merely on a basis of venerable age. Age in a school is proof of the quality of endurance, not necessarily of excellence. Many a fine old home, sere with years, rich in historical tradition, bountiful as to room space, is yet inadequate in bathroom accommodation when judged by modern standards.

The candidate must beware of any school whose entrance requirements are low, whose freshman classes are inordinately large, whose courses are poorly coordinated or whose clinical facilities are inadequate. The student should inform himself of the general educational and administrative policies of the school before he applies. He should inform himself also of the contact between a school and its alumni. The more successful medical schools encourage their graduates to return for graduate instruction. In short, the really well prepared student can afford to be discriminatory in his choice, despite the competition. Some students, because of financial restrictions, may be unable to exercise an entirely free choice. Whether or not this be the case, the student owes it to his school, to his sponsor and to himself to explore to the full the facilities available for acquiring information. This implies free use of the library in addition to the conventional classroom avenues of instruction. This further implies keeping in touch with his university after graduation in order to be in a position to profit from special postgraduate programs of instruction which may be offered from time to time.

What may the student demand from the faculty entrusted with his education? This is closely linked to the preceding question. The reputation of a school is in large measure determined by the reputation of its faculty. The faculties of almost all medical schools may be placed in three general age groups, with respect to its permanent teaching staff. The oldest group is approximately within a decade or so of the retiring age. The middle group has a teaching expectancy of about two decades. The youngest group is largely composed of men still relatively inexperienced. A faculty predominantly composed of men who have been teaching thirty years or more, or one composed principally of men without adequate teaching experience, is an unbalanced one. The former may be so steeped in tradition as to be incapable of seizing on new developments; the latter lacks the perspective of age and is unable to assess at their proper values the tried and the untried.

It is desirable also to ascertain beforehand the reputation of the faculty. Does it number many of national and international repute? Are its leaders imbued with a spirit of enthusiasm? Is the contact between faculty and students a free and healthy one? Are the students encouraged to observe, to think for themselves, to consult sources of original informa-

tion? Does it maintain that healthy spirit of cooperation and friendly rivalry so essential for esprit de corps? Are the faculty members possessed of a wide cultural background? A faculty which insists on rigid acquisition of factual knowledge, which presents its subject matter in cut and dried style, which does not stimulate its student body to consider subject matter in terms of the unknown as well as the known, is apt to turn out a stilted, smug, unprogressive student body.

What may the student look for from the profession of his choice? This depends so much on the character of the individual and the motives which cause him to choose a medical career, that it can be answered only in general terms. One of the finest attributes of medicine is that, in large measure, it provides its own satisfaction. This is reflected by the fact that only a small proportion of graduates forsake medicine entirely to go into other fields. The wide character of a physician's education opens for him an almost endless vista of intellectual exercise and adventure. During his premedical and preclinical years he is "exposed" to the natural sciences. The intellectually inclined can spend a pleasant and profitable lifetime cultivating further knowledge in those fields.

Another privilege afforded by medicine is the unique opportunity of observing our fellowmen at the one time when they are most completely off-guard. No other profession quite equals medicine in this respect. And herein lies much of the science and the art of the practice of medicine. Why is it that one patient complains bitterly of the pain of a slight bruise, another makes light of that of an extensive burn? Why does one patient with lobar pneumonia become delirious, another quiet, almost apathetic? Are the "imaginary ills" of the neurasthenic not fully as much an expression of disease as are the pain and abdominal rigidity accompanying acute appendicitis?

Then, there is the privilege, all the more precious because it is rare, of being able to contribute to permanent human progress by some chance discovery. This means more than the mere ability to relieve suffering. It is a unique attribute of the medical profession, this constant search for means of preventing as well as curing disease. No other profession can boast such unselfish altruism. Industry devises simpler and quicker ways of manufacture, only to stimulate an increased demand for its products. The medical profession proudly proclaims new ways of eradicating disease, without thought of personal gain. Today, typhoid fever is no longer a scourge; diphtheria is curable if treated early. Even tuberculosis has been reduced to a subsidiary position from its once first place as a cause of death. Every one of these discoveries carried with it the menace of reducing the incomes of physicians. Institutional treatment of tuberculosis not only minimizes its spread, but also takes away from the doctor a patient requiring many visits. "In medicine every advance in preventive

methods is from the monetary sense economically disadvantageous to the doctor."<sup>3</sup> Yet the search for curative measures goes on today at a rate undreamt of a quarter of a century ago. This is, indeed, the ideal of service. Finally, any physician who lives up to the high standards of his profession commands the respect of his entire community. I know of no finer example of this than is afforded by the following true story:<sup>3</sup>

"In a certain Michigan city there lives a medical practitioner who has served long and well, bringing into this world the children of the second generation, respected and loved by all. Returning from a well earned vacation, he found himself plunged into a civic holiday set aside to do him honor and named after him, 'Cameron Day.' In addition to a substantial gift which was bestowed upon him, there was marshalled that day a parade of Cameron babies, hundreds of them—a substantial evidence of his industry, but far more a token of the many homes in which Duncan A. Cameron had won for himself a place. And not only the Cameron babies and their fathers and mothers, but the entire community, paused to do him honor. What greater reward can come to any man than the merited esteem and affection of those with whom he has lived long and well!"

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## The Use of Palpation in the Study of Anatomy

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The aim of teaching anatomy in the medical schools is not only the acquisition of necessary knowledge. For the future physician, anatomy is at the same time the first teaching of medical observation. Due to his previous training in natural sciences, the student is accustomed to gain almost any of his scientific impressions by using his sense of vision. Of course, he is inclined to continue this practice in anatomical learning. The textbooks, anatomical atlases, the lectures further this tendency. He hardly thinks that the other organs of sense may enable him to gain very important impressions.

It is a commonplace practice to emphasize the importance of all organs of sense for medical diagnosis. The teachers of clinical medicine agree how useful a better training of the senses of hearing, smell and touch would be. The last-named sense could be developed greatly. Almost any student of medicine recalls that he had, among his teachers, men endowed with a special gift of palpation. Why should it not be possible for the average physician to acquire a greater perfection in this field? The example of the blind should be a hint.

Here the teaching of anatomy can render an essential service which will be recognized by the teachers of clinical methods of investigation in medicine and surgery. In fact, the modern textbooks and manuals of anatomy stress this point. The student is advised repeatedly to use palpation on the corpse, on himself, and on his friends to learn the facts which can best be transferred by the sense of touch. Surface anatomy is based on palpation to a large extent. A teacher of anatomy cannot emphasize this method too much.

I wish to outline a method which has served me greatly in training the sense of touch as an instrument of medical diagnosis. After having become acquainted with the basic facts of osteology from the study of bones placed at his disposal and with the aid of textbooks and charts, the student is taught to examine the bones under cover of a towel, or still better, in a small bag which can be closed by a drawstring. In the beginning the complete omission of the sense of vision leads to surprising difficulties. It is a very good test to find out whether these difficulties are overcome by the ability to recognize to which side a given bone belongs. This naturally calls for a knowledge of the essential anatomical facts. An examination based solely on palpation without any help from the eye is not only apt to strengthen the memory of the student; it also leads him to a three-dimensional understanding of the human body. Above all, it aids him to train an organ of sense which is unwarrantedly neglected in premedical education, although it is so important in medical practice.

## Study of Accomplishment of the 1935 Freshman Class in Seventy-eight Medical Colleges

Eighth Study

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The study made each year since 1928 of the accomplishment of the students in the medical colleges of the United States has proven to have great value in many ways. First, it is the only study which makes available data on the entire class. Therefore, it is possible to transmit to the arts colleges whence these students came a report on how they acquitted themselves in the medical college. Heretofore, such information has not been available, although a number of medical colleges have each year reported to the arts colleges represented in their student body what they have done. This study gives that information for all medical colleges. It also, for the first time, includes the medical schools of Canada.

The report on each college is sent out and a report is received from the individual colleges on the scholarship of these students in the college, by thirds of the class, thus making possible a correlation study between accomplishment in the arts college and in the medical college.

Furthermore, the information detailed in the whole study serves as an additional aid in the selection of students by the medical colleges. If, year after year, the students of an arts college make a poor showing in the medical college, the committee on admission is enabled to exercise a greater degree of caution in accepting students from that college, thus lowering the mortality of the freshman class which is still too high.

The data secured from this study are entered on the student register, which is a scholastic record of each medical student, beginning with his college work and ending with his internship. This register now contains approximately 25,000 cards and is unique in every way. It serves many good purposes. It is, probably, the only register of its kind and should prove to be a valuable contribution to education, both general and professional.

Many publications of figures of various kinds are made. There is much disagreement in the totals. This is easily explainable. The figures given in this report are based solely on the reports made by the medical colleges on those students who remained in college long enough to be counted as members of the class. One figure published is that of the number of applicants for admission to medical college who are accepted. A second figure is the number of students who have actually enrolled in the medical college. A third figure, the one given in this report, is the number of students reported on at the end of the freshman year. The variation between the first and third figures is usually about 10 per cent. In 1935, it was actually 9.5 per cent. Not all accepted

applicants, therefore, enter medical college. A few, usually about 5 per cent, drop out within a few days to a week after the opening of the session. Some find that they are not going to like medicine; some feel that they need more preparation and return to college. Hence, in reading published reports on medical students these facts must be borne in mind and not be charged to error in reporting.

Each year, about 600 arts colleges are represented in the student body of the freshman class. About 400 of these colleges send two or more students to medical colleges. Many of the remaining 200 colleges send only one student. For each of these colleges there is on file in the office of the Association a card on which is entered the name of the student, his aptitude test rating, if any, the name of the medical college attended and a summary of his accomplishment with his standing in class by thirds. Nearly 5,000 such cards are now in this file which dates back to 1928. As stated above, the information on these cards is sent to the arts colleges for their information.

Not all of these arts colleges are approved by any one of the accepted evaluating agencies, although their students may be admitted to the university of the state in which the college is located, which makes these students acceptable by any of the medical colleges in membership in this Association. This action was taken by the Association because it was felt that non-approval by an accrediting agency is not always based on poor scholastic standing. Another provision makes it possible to accept students from a college which is without approval even by the state university, but such acceptance must be filed in the office of the Association as a protection for the student when, later, he makes application for a license to practice. It is generally admitted that a desirable student for medicine may come from such a college, one whose scholarship is excellent, one who for economic reasons could not take his college work elsewhere than in the college located in the town of his residence. He may, therefore, be accepted.

Each year, however, the number of non-approved colleges shown in this list has grown smaller, and fewer students come from these colleges. In the 1935 freshman class, 615 arts colleges were represented. Of this number, only 114 are not approved—approximately 18.5 per cent. The number of students from these non-approved colleges has also become smaller—241, or 3.8 per cent, in 1935 as against 298 in 1934. It would be expected that with the care in selection which is exercised in accepting these students that they would do well in the medical college. However, the facts do not support this belief (Table 6). These students as a group do not do as well as do those students who come from the approved colleges (Table 2). Perhaps this shift must be charged to the tremendous difference between general and professional education—a fact which often is not recognized by students. This study has shown each year that many students who rank high in the arts college make a very poor scholastic record in the medical college, and, vice versa. In endeavoring to arrive at the true solution of the matter, many factors must be taken into consideration, not the least of which is change in environment.

The clamor for reducing the number of medical students and, perhaps, greater care in selection, resulted in a reduction in the number of students reported on as having been members of the 1935-1936 class. There were 9.5 per cent fewer students in 1935 than in 1934—6,352 as against 6,683—the latter having been the largest freshman class ever enrolled in the medical colleges of the United States. The number is still in excess of the replacements needed each year, but it must be borne in mind that many of these students will not graduate. The records show that approximately 25 per cent of every entering class fails of graduation! Thus, the number of graduates is not greatly in excess of the need for replacement. Growth of population may absorb the excess. Furthermore, more and more each year, many graduates choose not to enter on practice. Some decide to teach; others go into public health work; many become hospital administrators; a few drop out of the picture altogether. It is not wise, therefore, to reduce the number of new matriculants too much lest, in a few years there be a shortage in the number of physicians required for practice and other ancillary medical activities.

#### PREPARATION FOR THE STUDY OF MEDICINE.

Always there is heard the demand that the requirements for admission to medical college be increased from the present minimum of two years of college work (60 hours) to three years (90 hours). Some have contended that there is no need to raise the requirements as to time because the students are recognizing the value of more preparation—and the colleges are urging their students to stay with them longer. Perhaps, many intending medical students hold the conviction that more preparation will prove to be an easement in securing admission to a medical college. And, it is well known that many medical colleges accept few, if any, students who offer only the minimum of credits set forth in the college announcement. A few medical colleges publish a minimum of two years of college work but actually accept only students who have had three or more years of college work. Medical colleges holding out a minimum of three years of college work accept only students who hold a bachelor's degree. These facts may be responsible for students remaining in college longer than for the prescribed minimum period of preparation, although experience has shown that students do feel that more preparation is advantageous when they try to carry the unusual load of medical work. The study of applicants which is made annually by the Association of American Medical Colleges has shown that, on the whole, students who offer only the minimum of preparation are not discriminated against. True, they are in the minority so far as numbers are concerned, but the percentage of acceptances for this group is as large as is that for the degree holding group.

Nevertheless, the number of students coming with less than three years of college work is steadily growing smaller, and, per contra, the number holding a degree is steadily growing larger. Of the 1935 freshman class (6,352), exactly 13 per cent had less than three years of college work, and only 8.5 per cent had no more than two years (60 hours) of college work. Most of

the remaining 4.5 per cent had nearly three years (more than 75 hours) of credit. Many had attended college for three years but failed to earn credit for 90 hours.

The variations in the procedure of acceptance of these students is shown in Table 1 as between the acceptance of students who came from the parent university and those who came from other universities. In the latter instance, greater care in selection was exercised, if one is to judge from the figures, except in the case of applicants holding a bachelor's degree. Does this mean that the degree is not regarded as highly by the medical college if it has been

TABLE 1. Summary of Admission Credentials of Freshmen Enrolled in Seventy-eight (78) Medical Colleges of the United States: Academic Year 1935-1936.

	Own University		Other Universities		Totals	
2 years.....	326	13.6%	219	5.5%	545	8.5%
2-3 yrs.....	136	5.7	143	3.6	279	4.5
3-4 yrs.....	1042	42.8	361	22.0	1903	29.8
4 years.....	187	7.7	264	6.8	451	7.1
A.B.....	486	19.7	1355	34.6	1841	29.1
B.S.....	255	10.5	1078	27.5	1333	21.0
No degree: 49.9% Degree: 50.1%						

conferred by the parent university as is the degree conferred by another university? Whatever the reason for such selection may be, the figures tell an interesting story and give much opportunity for conjecture. In this connection it must be remembered that a few medical colleges are not a division of a university or, as in one instance, the medical college is the only college in the university. The student body of this medical college is a large one and

TABLE 2. Accomplishment of Freshmen Enrolled in Seventy-eight (78) Medical Colleges of the United States: Academic Year 1935-1936.

	Own University*		Other Universities**		Totals***	
Clear .....	1821	76.1%	2643	68.9%	4464	71.7%
Encumbered .....	278	11.6	580	15.1	858	13.8
Out .....	222	9.3	469	12.2	691	11.1
Withdrew .....	71	3.0	144	3.8	215	3.4
	2392		3836		6228	

\*Exclusive of 40 freshmen at Yale and Hopkins who will not be graded until they have completed the sophomore year.

\*\*Exclusive of 84 freshmen enrolled at Yale and Hopkins who will not be graded until they have completed the sophomore year.

\*\*\*Exclusive of 124 freshmen enrolled at Yale and Hopkins.

only degree holders are accepted for admission, although its printed requirements call for three years or 90 hours of college work. As a matter of fact, only one medical college has a flat requirement of a bachelor's degree, plus certain definite requirements as to subjects. There are no exceptions to this rule; no "ifs," "ands" or "buts." As stated previously, several medical colleges select only degree holders although their published requirements are less than a degree. In one instance, the minimum is two years of college work.

Table 1 should be scrutinized carefully as it elucidates well the practice of medical colleges in the matter of choosing students from their own and from other universities.

Table 2 sets forth the accomplishment of the 6,352 freshman students of the class of 1935-1936,—again according to "own" and "other" universities and the total of both. As every one knows, medical colleges are in a position to check carefully on the scholastic standing of the applicants from their own universities; hence, a better selection can be made. They pick the best of the lot—which is reflected in the accomplishment of "own" and "other" students.

TABLE 3. Accomplishment of Freshmen in Seventy-eight (78) Medical Colleges in the United States: Academic Year 1935-1936.  
(Own University)\*

	Clear		Encumbered		Out		Withdrawn		Total
2 years.....	256	78.5	30	9.3	34	10.4	6	1.8	326
2-3 yrs.....	107	78.7	12	8.9	13	9.5	4	2.9	136
3-4 yrs.....	808	78.1	114	11.0	72	7.0	30	2.9	1034
4 years.....	114	61.3	32	17.2	26	15.0	14	7.5	186
A.B. ....	356	77.6	48	10.5	45	9.8	10	2.1	459
B.S. ....	180	71.7	42	16.8	22	8.5	7	2.8	251

\*Exclusive of 40 freshmen enrolled in Yale and Hopkins.

"Own" students make a much better record than do the "other" students. Fewer of them fail or are dropped,—which helps the average considerably. On the whole, the record of the 1935 class is better than that of the 1934 class. Only 14.5 per cent were "out" at the end of the year as against 15.3 per cent in 1934. However, the actual number of failures, exclusive of those who withdrew for reasons other than failing scholarship, is almost the same in both years,—11.5 per cent in 1934; 11.1 per cent in 1935. The number of

TABLE 4. Accomplishment of Freshmen in Seventy-eight (78) Medical Colleges in the United States: Academic Year 1935-1936.  
(Other Universities\*)

	Clear		Encumbered		Out		Withdrawn		Total
2 years.....	142	64.8	32	14.6	33	15.1	12	5.5	219
2-3 yrs.....	90	62.9	27	18.9	16	11.2	10	7.0	143
3-4 yrs.....	589	68.5	130	15.1	111	12.9	30	3.5	860
4 years.....	134	51.0	63	23.9	56	21.3	10	3.8	263
A.B. ....	971	74.2	165	12.6	132	10.1	40	3.1	1308
B.S. ....	717	68.8	163	15.7	121	11.6	41	3.9	1043

\*Exclusive of 84 freshmen enrolled at Yale and Hopkins.

encumbered records is smaller by only 0.1 per cent, but the number of clear records is greater by 1 per cent; not much difference, but, at least, for the better. It is still not as good as was the record for the 1933 class.

If the reports from Yale and Hopkins could have been included in this table, it is probable that a change for the better could have been reported as both schools have, in the past, made excellent reports on their students. Nevertheless, there is still room for improvement in all brackets.

Tables 3 and 4 are of special interest inasmuch as they correlate accomplishment with preparation for the study of medicine, again on the basis of "own" and "other" university students. The "own" students have much the best of it in all brackets, especially in the non-degree holding groups, except the "4 years" group which includes those students who attended college for 4 or more years—a few up to 9 years. These are not, on the whole, the poorest students. They include students who have not had a definite objective in mind; students who took such courses as held interest for them or who had not yet reached a conclusion as to which field of endeavor was the most attractive one; or students who were not well advised as to which courses were the best ones for them to take. Yet, this "hit and miss" adventure in education apparently did not bear good fruit. This group had the fewest clear records and the largest percentage of failures of any group. This is also true of the same group in the "other" classification. Should not selection of students from this group be made with extreme care?

TABLE 5. Accomplishment of all Freshmen Enrolled in Seventy-eight Medical Colleges of the United States: Academic Year 1935-1936\*

	Clear		Encumbered		Out		Withdrawn		Total
2 years.....	398	73.0	62	11.4	67	12.3	18	3.3	545
2-3 yrs.....	197	70.6	39	14.0	29	10.4	14	5.0	279
3-4 yrs.....	1397	74.1	244	13.0	183	9.8	60	3.1	1894
4 years.....	248	55.2	95	21.2	82	18.3	24	5.3	449
A.B. ....	1327	75.1	213	12.1	177	10.0	50	2.8	1767
B.S. ....	897	69.3	205	15.8	143	11.1	48	3.8	1294

\*Freshmen (124) from Yale and Hopkins not included.

It is astonishing that in the "own" group the non-degree holding students (except the 4 year group) excelled the degree holders in the bracket of clear records and in having fewer failures. The "others" did not do so well. They had fewer clear records and more failures.

Table 5 is a composite of tables 3 and 4. It bears out the statement often made that the A.B. students make the best records. Next come the 3 to 4 years group, and then the 2 years group. Next to the 4 years group, the B.S. students make the poorest showing. This fact has been discussed much in the past few years, pro and con, and need not be enlarged on here, except to emphasize, again, that more culture beats too much science. This has been shown to be true year after year. If the time of preparation could be lengthened to include both culture and more science, it is probable that the product of such a course would be the ideal student, but time must remain the determining factor in the preparation of students; something must be sacrificed; something is preferable and the choice should be made accordingly. It must be accepted without reservations that the cultural course yields the best results. Not that science is not culture; it is, but there are other, doubtless more essential, courses which must be regarded as being essential in the making of

a good physician. Other considerations should be left for future consideration, for further education and development. It is not possible to do everything in the time available; therefore, it is wise and essential to do the best possible and leave something to the future.

Table 6 sets forth the accomplishment of the students coming from the non-approved colleges. The record is, in the main, comparable with the record of the class, as a whole, so far as the various brackets are concerned, but it is not as good in individual brackets. This item has been discussed at some

TABLE 6. Accomplishment of Students from Non-Approved Arts Colleges (241), with Entrance Credits.

	Clear		Encumbered		Out		Withdrew		Total
2 years.....	31	58.5	9	17.0	10	19.0	3	5.5	53
2-3 yrs.....	9	47.3	7	36.8	1	5.2	2	10.5	19
3 years.....	33	57.9	8	14.0	14	24.6	2	3.5	57
4 yrs or more....	6	42.9	3	21.4	3	21.4	2	14.3	14
A.B. ....	36	70.6	4	7.8	7	13.8	4	7.8	51
B.S. ....	25	55.6	8	17.7	10	22.3	2	4.5	45
Other Degs.....	1	50.0					1	50.0	2
Totals .....	141	58.3	39	16.3	45	18.7	16	6.6	241

14 of these students were repeaters.

length in the beginning of this report, hence further discussion here is unnecessary.

Table 7 makes a correlation between the aptitude test rating and the accomplishment in the medical college. The three groups of ratings show a result in accomplishment which is also comparable with scholarship in the arts

TABLE 7. Correlation of Aptitude Test Rating with Accomplishment (71.8% of the 6,352 Students took the test).

Test Rating	Clear	Encumbered	Out	Withdrew	Total
1-33	643	203	198	46	1090
34-66	1027	202	157	49	1435
67-99	1608	165	102	44	1919
Totals	3278	570	457	139	4444
	73.8%	12.9%	10.3%	3.0%	

college. In the clear record column, the detailed figures (not shown in this table) show that as the ratings become higher, the number of students in the upper third of the class grows larger. This is also true of the middle third of the class. The reverse is true of the lower third of the class. Almost one-half of those in the 1-33 rating group are in the middle third of the class; nearly one-half of those in the 67-99 rating group are in the upper third of the class. In the encumbered group for all ratings, the lower third of the class contains nearly all of the students so listed. As for those who failed completely, the figures shown in the table are what one would expect,—a gradual diminution from the lowest to the highest rating group. It is rather remarkable that so few of those who take this test enter medical school. The ratings

included in table 7 are taken from the aptitude tests of 1933 and 1934. Some students take the test but do not enter medical college the following year. Only 4,444 students are represented in this table, yet more than 10,000 took the test in each of the two years. Perhaps, many students regard the test as a good exercise. It gives opportunity to "take stock" how well one has done up to that time and to reshape courses to a better purpose. On the other hand, many students may be discouraged from entering medical college because the test, doubtless, does give information as to whether one is or is not likely to succeed in medicine. Having failed in the test, a student may decide to enter some other field of endeavor. Some students, apparently, do not heed the warning of a poor rating in this test, enter medical school, and then are forced to withdraw. Nearly two-thirds of all students who withdrew from medical school for reasons other than scholarship had taken the test. True, "other reason" may include many students who were failing, but unless this is specifically stated in the report sent in by the medical college, the case is entered under "other reason." Those who withdrew because of poor or failing scholarship are charged to the failures, which also include the dropped, failed and must repeat students.

TABLE 8: Data on the Number of Matriculants Who Continue Medical Work.

Year of Entry	Freshmen	Sophomores	Juniors	Seniors
1932	6457	5586 86.5%	5511 85.3%	5199 80.5%
1933	6650	5887 88.5	5471 82.2	
1934	6683	5592 83.7		
1935	6352			

By way of explanation, it must be stated that the encumbered records are those of subject conditions or failures and incompleting work,—all of which are amenable to correction before the sophomore work is begun or in the summer or even during the next academic year. It is something which can be "made up."

#### SOPHOMORES; JUNIORS; SENIORS.

In attempting to carry this study on into the sophomore, junior and senior years, one immediately is confronted with the fact that each year students drop out of course, for one reason and another, and return one, two, three, or even more years later and attempt to get into step. It is apparent, then, that not all those who begin to study medicine continue to do so uninterruptedly. Hence, the figures given represent the actual number of students reported on at the end of the year (not, necessarily, the number enrolled at the beginning of the year), regardless of when they began their work. Nevertheless, certain definite facts emerge from these figures.

The class which began as freshmen in 1932 numbered 6,457 students. Four years later, in 1936, 5,199 students, or 80.5 per cent as many as entered in 1932, completed the work required for graduation (except internship; required by 15 schools). If this class were studied carefully, it could be shown that many of those who are counted in the final figure began the study of medicine one, two, three, even five years prior to 1932. A careful check is now being made on that point and later it will be possible to give accurate figures.

The same statements apply to the other classes. Of the 1933 freshman class, numbering 6,650, 88.5 per cent was the count for these students as sophomores and 82.2 per cent as juniors.

The 1934 freshman class, numbering 6,683 (the largest freshman class in history), had dwindled to 83.7 per cent in the sophomore registration.

Another interesting item is the accomplishment of these three classes. It is set forth in table 9. The percentage of "clear" records becomes higher each year; the others, "encumbered," "out" and "withdrew" diminish with each succeeding year. Although the "outs" in the senior year are few in number (29 failed and 22 withdrew, 7 of these being deaths), it would seem that this is rather a large number of failures in the final year. It has often been said, although no proof of the correctness of the statement has been brought forward, that some schools permit a junior with a subject condition or failure

TABLE 9. Accomplishment of Sophomores, Juniors and Seniors of 1935-1936 Session.

	Total	Clear	Encumbered	Out	Withdrew
Sophomores .....	5592	77.3%	15.8%	6.0%	0.9%
Juniors .....	5471	81.4	16.1	1.9	0.5
Seniors .....	5199	97.4	1.6	0.6	0.4

4 Sophomores, 2 Juniors and 4 Seniors died in course. These are included in the "Withdrew" column.

to go on into his senior year with the understanding that these incumbrances will be removed before the beginning of the second semester. This, if true, may account for some of the failures. Of course, as every one knows, the rules do not permit beginning senior work unless the previous record is entirely clear. It has also been said, although, again, proof is not at hand, that some schools force admission to the senior year by raising the grades of failed juniors, students who have dropped right at the wire, so that they could continue their work interruptedly as seniors, thus saving one year of time. Whatever the reason for the large number of failures, it is astonishing that it is as it is. One would hardly expect a senior to fail in any subject. Elimination should have been complete before the senior year is begun. A number of these "failed" students will be permitted to repeat the year, if they wish, but unless such action is taken specifically, these students will not be able to enter any medical school as seniors as all schools have ruled that no one will be accepted beyond the junior year, which should prove to be a stimulus for the lazy but competent student and a deterrent to the incompetent, over-ambitious student.

## DATA ON STUDENTS IN CANADIAN MEDICAL SCHOOLS.

This is the first year that this study has been extended to include the Canadian medical schools. It is the first time that these schools will have a composite picture of the accomplishment of their students. Two schools (Laval and Montreal) did not participate in the study, hence data on 448 students cannot be included in the summaries on accomplishment. The figures on total numbers of students in these two schools are available.

Owing to the differences in methods of admission, it was not possible to make certain that the division of students into four classes, as is done in the medical schools of the United States, was correct. However, the error, if any, is slight and would not alter the figures given to an appreciable extent. Doubtless, another year will make it possible to classify correctly all of the students in the medical schools of Canada.

During the academic year 1935-1936, 2,665 medical students were enrolled in all classes in the ten medical schools of Canada, as follows: Arts and medicine, 386; 1st year, 475; 2d year, 458; 3d year, 490; 4th year, 408. The 183 students enrolled in the University of Montreal and 265 students enrolled in Laval University are included in the grand total of students but not in the divisions into classes because information on that point could not be secured despite repeated requests. That number of medical students is approximately

TABLE 10. Data on the Accomplishment of Students in all Classes of Eight of the Ten Medical Schools of Canada.

	Clear	Encumbered	Failed	Withdr.	Total
Arts & Med.....	244—63.2%	79—20.5%	53—13.7%	10—2.6%	386
1st Year .....	343—72.2	81—17.0	47— 9.7	4—1.1	475
2nd Year .....	360—78.6	83—18.1	13— 2.8	2—0.5	458
3rd Year .....	383—78.1	97—19.8	10— 2.1		490
4th Year .....	377—92.4	25— 6.1	3— 0.7	3—0.7	408

comparable, on the basis of population, with the number of students enrolled in the medical schools of the United States,—2,665 students and 11,000,000 population in Canada; 23,000 students and 123,000,000 population in the United States.

The graduates from the Canadian schools numbered 464. The medical schools of the United States graduated about 5,200 students.

As to the accomplishment of the 2,217 students reported on by the eight medical schools participating in the study, table 10 sets forth what happened.

Much still remains to be done to perfect the curriculum from the scholastic point of view, and far more from the pedagogic side. More and more often teachers are being charged with possessing a somewhat indifferent or listless attitude toward teaching; with having too large a desire to carry on research, —but there seems to be agreement among educators in general that teaching methods should and can be improved without sacrificing research. That is true not only of medicine but of all the professions; in fact, of education as a

whole. Better teaching would be reflected by better scholastic accomplishment. Everyone who holds a teaching position should be fully aware of his responsibilities in that direction and discharge them to better advantage than is now being done. Each year there is some improvement to be noted, and it is far from being improbable that eventually, perhaps sooner than is expected, a most gratifying change will be apparent. Scientists will be as much interested in teaching as in their science, especially if they hold a teaching position. Teachers in the preclinical, so-called, sciences are rather prone to over-emphasize their research work, although not unmindful of their teaching responsibilities. When they meet together in their national associations, they rarely discuss pedagogy, the item of greatest concern to the student. It would be extremely interesting to note the change, as shown by the results of student work, which would result if pedagogy were given a place on the program of every scientific body whose members also have a teaching responsibility.

Grateful acknowledgement is made of the hearty co-operation and many courtesies and patience shown by the colleges participating in this study. The results shown justify the study. Not only medical schools and medical educators but all educational institutions and their faculties will find much of value to be gleaned from a careful study and analysis of the data presented.

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*1936 Freshman Class*

A review of the enrollment blanks of the medical schools of the United States discloses the fact that the 1936-1937 freshman class is by far the smallest in numbers of any freshman class for many years, 5906. This number will be even smaller when the reports on students who have completed the year or who attended long enough to be counted as having been members of the class are received at the end of the academic year. This finding is in keeping with what has been the trend in attendance in professional schools for a considerable number of years. It is an indication, a sort of barometer—one which is always true—of the general economic status of the country as a whole. When business is good, the attendance in the professional schools drops; when business is bad, it goes up. For instance, for the year 1933-1934, the number of students reported on at the end of the year was 6,659; in 1934-1935, it was 6,352. Thus, it is apparent that the fear of over-production of physicians need not be so great as it has been in recent years. In fact, reports from a number of sections of the country seem to indicate that the number of graduates is not sufficient to supply the need caused by death, removal and increase in population. True, in the larger cities, over-crowding is still a menace to economic security, but regulation of that factor is as yet impossible.

Year after year, the demand for raising the minimum of entrance re-

quirements is counteracted by larger amount of preparation of students entering medical schools. Those who have had less than three years of preparation are steadily decreasing in numbers. In the 1936-1937 freshman group, only 9.8 per cent have had less than three years of preparation, and of these only 6.2 per cent had no more than two years, or 60 hours, of preparation. The remaining 3.6 per cent had from 70 to 85 hours of preparation.

While the evaluation of a bachelor's degree is a variable factor, nevertheless, 55.2 per cent of the 1936-1937 freshmen held a bachelor's degree (A. B., 32.8 per cent; B. S., 22.4 per cent), which is 3 per cent more than in the preceding year. In the 3 to 4 years group were 34.2 per cent of the students, and 6.0 per cent had had more than 4 years (one as much as 9 years) of college credit without having received a bachelor's degree.

Thus it is very apparent that students intending to enter medical school are taking more college work, whether for educational reasons or to increase their chances of acceptance by a medical school is not determinable, nevertheless, it is true that additional work in college does go far to give a broader, more liberal educational foundation, hence is commendable.

It must not be overlooked that the students who have less than three years of college work and are accepted by a medical school, on the whole, do most creditable work in

the medical school, which must be interpreted on the basis of care in selection. The records show that they stand next to the degree men, that is, those who hold a degree in arts. The men with a degree in science stand forth. This, too, is the finding of many years of observation, emphasizing the greater value for medical study of a liberal education over a too highly specialized science course; not that science is not liberal education, so is medicine, but the arts course gives something which the heavier science course does not give in this particular field of activity.

On the whole, it is evident that the problems of over-crowding and higher entrance requirements are being solved in a perfectly natural way and should not occasion alarm to the degree that there may be danger of too small a supply of physicians throughout the country without specific reference to the numbers flocking to the cities. Then, too, many graduates in medicine, more each year, do not enter on the practice of medicine *per se* but enter ancillary fields, such as health officers, hospital administrators, teachers, research workers, etc. The prospect in all its phases is not as gloomy as it has appeared to be for a number of years.

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#### *Venereal Disease Control*

At a conference on venereal disease control called by Dr. Thomas Par-ran, surgeon general of the Public Health Service, in December, 1936, attention was directed to the present "inadequacies" of instruction in the public health control of syphilis and gonorrhea. In general, it was the impression of those who attended the conference that sufficient emphasis was not placed on the early diagnosis

and treatment of early syphilis and the possibilities for the prevention of prenatal syphilis through the treatment of the pregnant syphilitic woman and that greater emphasis might be placed on the general measures of control of the venereal diseases in the medical schools of the country.

Dr. Udo J. Wile, chairman of the Section on Co-operation of the Private Physician in the Control of the Venereal Diseases, in his report, said:

"The question of the ability of the practicing physician to co-operate to the best extent is intimately concerned with his training in these diseases in the under-graduate medical schools. It was brought out in the discussion of this part of the program that of sixty-three medical schools, special departments for the teaching as well as for the management of syphilis existed in only about a half dozen. In fifty-eight medical colleges no separate course in syphilology is given but the subject is handled in connection with, and as a part of, the teaching of other subjects. The survey upon which these figures were based did not take into account gonorrhea, chancroid, or other genito-infectious diseases. It is very evident from the essays presented, as well as from the discussions which followed, that an essential part of the successful participation of the private practitioner in the more adequate care of syphilis, which might lead to its control, must mean better and more instruction in his undergraduate days.

"The difficulty of introducing into an already over-crowded curriculum, additional teaching hours, is recognized as a serious obstacle to the initiation of new courses or of formal teaching in venereal disease treatment and control, where such does not now exist. However, it is felt that many hours now wasted in view-

ing surgical operations from an amphitheatre, or in listening to the details of an obscure operation for brain tumor, as examples of many such unprofitable hours, might better be occupied with instruction in the diagnosis and treatment of venereal diseases as well as of their public health aspect. It is believed, therefore, that adequate instruction, such as is now given in some institutions, could by adjustment be introduced into others without adding hours to an already full curriculum.

"With the remedial measures now at hand, and with the control program already initiated, particularly in larger cities, it has become increasingly difficult to find suitable teaching material for the proper instruction of medical students in the recognition of the various forms of venereal diseases with which it is imperative they should be familiar. The diagnosis of venereal disease entities cannot be successfully carried on with charts, lantern slides, wax models or pictures. It is urged that where public health agencies and public health clinics exist in the neighborhood of medical schools, cases showing the various clinical phases of syphilis, gonorrhea and chancroid should be so diverted that they may be available for teaching purposes as well as for treatment.

"In connection with more adequate undergraduate instruction, it is recommended that the Surgeon General of the Public Health Service place before the Council on Medical Education and Hospitals of the American Medical Association, and before the Association of American Medical Colleges, the present inadequacies of instruction in the public health and clinical aspects of syphilis and gonorrhea.

"In connection with postgraduate

instruction, it was brought out that this should reach out in divers ways to secure the maximum degree of efficiency.

"It seems now accepted that the obligation of medical schools in the education of its students does not cease with their graduation, but should continue more or less indefinitely after they have graduated and are in practice, through either university extension courses, by which means newer ideas, newer methods of treatment, and newer approach to disease problems are carried to them, or that they should be encouraged, from time to time, to return to the sources of learning in order to familiarize themselves with practical demonstrations of newer methods in diagnosis and treatment. It is of particular importance that the practitioner's interest in communicable diseases shall be kept constantly before him.

"Post graduate instruction in venereal diseases, both from the epidemiological side as well as from the angle of treatment methods, should be available for public health officers, not only for those who are attached to special venereal disease units of public health services, but also to those who are associated with general communicable disease prevention. Such instruction, as well as that designed to prepare those who will serve in a consulting capacity, should best be given by university teaching centers. Such university instruction in the case of practitioners who desire to brush up, should not be less than one month in duration, and preferably longer; for those who deal with venereal diseases as a part of communicable disease control, not less than three months should be occupied in their postgraduate instruction at a university teaching clinic. For

postgraduate instruction reaching out to the practitioner of medicine to be widely available, some form of financial assistance to the physician while he is away should be made. In this connection it is well to call attention to the fact that the Commonwealth Fund and the Kellogg Foundation in innumerable instances have made available for physicians prolonged courses of postgraduate study through direct subsidy to them during their absence from practice. A wider extension of such altruistic and philanthropic financial assistance should be a definite aim of those interested in widening the sphere of postgraduate medical instruction.

"To sum up, postgraduate instruction for the general practitioner may be carried out by extension university work; by the return of the student to the source of his initial instruction for renewed studies, preferably financed by interested philanthropic foundations; by means of symposia and exhibits at medical meetings, and through medical journals and peripatetic postgraduate courses by state medical societies; for field workers, advanced training in the university center for not less than three months and preferably longer; for students dealing with general health problems, work in venereal diseases, either at teaching centers or under competent instruction in syphilis treatment centers for periods of not less than one month."

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#### *Congress on Medical Education, Hospitals and Licensure*

The thirty-third annual Congress on Medical Education, Hospitals and Licensure was held in Chicago, February 15 and 16, 1937. The attendance was a most gratifying one. The programs offered by the various

groups who met at the same time were well arranged and received with enthusiasm.

Reports on the progress made in evaluating the data obtained from the survey of medical schools were presented. Each medical school inspected will shortly receive a graph or pattern map which will evaluate the school or college in accordance with the findings of the inspection. The basis of evaluation is the decile; the divisions are: Organization, administration; library and the departments of instruction individually.

The symposium on cancer elicited a very favorable response by way of commendation. It offered much information and should prove to be a stimulus for renewed effort in research. The symposiums on the selection of students and on the technic of examinations call for careful study of the material presented. It should be helpful to admitting committees and teachers even though the perfect method of selection and examination has not yet been discovered. But, there is notable improvement in selection and examination which should give encouragement to harassed deans and teachers. Dr. Karsner's "Philosophical Comments on Examinations" met with a great deal of commendation.

Space and time forbid comment on all the good papers read, but suffice it to say that the entire program was a good selection; every one present must have found something "up his alley" which would make the trip to the meeting worth while.

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#### *Residency in Psychiatry*

The State Hospital for Mental Diseases, Howard, Rhode Island, offers a residency for a woman, salary \$1,800 per year with full maintenance. The service consists of women patients who have a chronic disease.

*Graduate Medical Education  
in Columbia University*

The program of graduate medical education in Columbia University is based upon the need for better, rather than more, physicians and for opportunities by which those in practice and those qualified to specialize may be prepared to meet their responsibilities to patients and the public. The plan provides for the continued education of physicians in practice and for the adequate training of specialists.

A wide variety of short courses has been organized in the hospitals and clinics affiliated with the university. Those for the general practitioner furnish opportunities for him to overcome deficiencies in his earlier training, to get abreast of new knowledge and the latest methods of diagnosis, treatment, and prevention which he can use in his practice, and to learn the indications, limitations, and value of those technical procedures which require the attention of a qualified specialist. The instruction consists largely of first hand clinical experience, demonstrations, and discussion. It is limited almost entirely to teaching in the outpatient departments.

For those already practicing a specialty, advanced instruction in separate groups is given in the surgical, therapeutic, and diagnostic methods of the various limited fields of practice. Enrolment is restricted to those who may reasonably be regarded as prepared to benefit by the advanced instruction. Courses are being considered for those who, qualified by previous training and experience, need only a short period of further training to meet the requirements of one of the national boards for the certification of specialists. No university credit or certificate is given for the short courses.

The proper training for a specialty includes three major phases. The first is a sound basic medical education,

including a hospital internship. To be satisfactory, the internship must provide a real educational experience. The second is an advanced training in those medical sciences concerned particularly with the limited field of clinical medicine. The third phase is a long, active, clinical experience as a resident in a hospital equipped and staffed to provide graded responsibilities under the supervision of experts in the field of medicine elected. The clinical period should give the resident ample opportunities to become thoroughly competent in the specialty.

The trustees of the university in 1932 created a higher degree, Doctor of Medical Science, to identify the individual who obtains that recognition as qualified by a university grade of training in one of the specialized fields of clinical medicine. A single level of graduate medical education is recognized for this purpose.

The requirements for the Doctor of Medical Science Degree (Med. Sc.D.) are:

1. Graduation from a medical school approved by Columbia University.
2. Completion of an internship of not less than one year in a hospital approved by the university.
3. A period of study after the internship of not less than three years in the university or in hospitals and laboratories recognized by it. At least one calendar year must be spent in this university or in one of the hospitals affiliated with it.
4. Intensive graduate training and original work in one or more of the basic medical sciences of anatomy, embryology, physiology, biological chemistry, pharmacology, pathology, and bacteriology related to the special field of study elected.
5. An active experience during the three year period of not less than eighteen months in the hospital, clinics, and diagnostic laboratories of the specialty elected.
6. Written, oral, and practical

examinations in the specialty elected and in clinical, laboratory, and public health fields to which the specialty is related.

7. An acceptable dissertation on an investigation conducted in, or closely related to, the specialty elected.

The fields of graduate studies are: Dermatology, Internal Medicine, Neurology, Obstetrics and Gynecology, Ophthalmology, Orthopedic Surgery, Otolaryngology, Pathology, Pediatrics, Psychiatry, Radiology, Surgery, Tropical Medicine, and Urology.

Every student will pay a university fee of \$10.00 for each winter or spring session and, before graduation, a fee of \$20.00 for the application for the degree. Whether or not a student will be entitled to exemption from tuition fees will be determined by the assistant registrar with the approval of the dean. A limited number of fellowships are available.

In recognition of the fact that the training of the medical student, the intern, the resident, the general practitioner, the specialist, and the public health administrator are merely different phases of a single broad educational problem, all aspects of medical education in Columbia University are under the general supervision of a single Faculty of Medicine. This faculty is representative of the interests of graduate as well as undergraduate medicine. Subject to the

statutes of the university, it has general oversight and control over undergraduate and graduate instruction in medical studies offered in any part of the university or under its authority and makes all rules and regulations governing such instruction.

The program conforms to the standards adopted in 1934 by the Council on Medical Education and Hospitals of the American Medical Association and the Advisory Board for Medical Specialties, the latter representing the American Hospital Association, the Association of American Medical Colleges, the Federation of State Medical Boards of the United States, the National Board of Medical Examiners, and the twelve national boards of specialists dealing with graduate medical education and certification.

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#### *Interns Wanted*

The Eastern Maine General Hospital, Bangor, Maine, an approved hospital, is desirous of obtaining interns, service to begin July 1, 1937. Protestants, Americans, white, male, in the upper or middle third of the class preferred.

Mercy Hospital, Bay City, Michigan, an approved hospital, has openings for three interns. Male gentiles, graduates of approved medical schools preferred. This is a twelve months rotating service. Pay, \$25 per month with full maintenance.

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## College News

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### *Harvard University Medical School*

A course of free public lectures was opened January 10, to continue each Sunday afternoon until March 21. The following program will be presented. Philip Drinker, Ch.E., Air Conditioning and Health; Dr. Soma Weiss, Blood Pressure—Low and High; Dr. Tracy J. Putnam, Pain and Its Treatment; Dr. Charles Macfie Campbell, Social Stress and Mental Health; Dr. William T. Salter, Cancer; Dr. Edward D. Churchill, Surgical Aid in Lung Diseases; Dr. Theodore L. Terry, Care of the Eyes; Dr. Louis K. Diamond, The Anemic Child; Dr. William H. Robey, Preparing for a Comfortable Old Age; Dr. Arthur T. Hertig, Abnormal Terminations of Early Pregnancy; Dr. Joseph C. Aub, Glands of Internal Secretion and Human Activity.

Dr. Hans Zinsser, Charles Wilder professor of bacteriology and immunology, Harvard Medical School, Boston, gave the annual Theobald Smith Lecture of the New York Society of Tropical Diseases, January 22, at the Cornell University Medical College, on "Rickettsia Diseases."

### *University of Cincinnati College of Medicine*

Dr. Lee Foshay has been appointed acting director of the department of bacteriology, succeeding the late Dr. W. H. Wherry. Gifts amounting to more than \$10,000 have been received to be expended on research.

A series of lectures on "appreciation" is being sponsored by the student body. Some of the topics to be

discussed are: "On Collecting First Editions;" "The Popular Appeal of Classical Music;" "Modern Development of the Modern Novel;" "The Lawyer Looks at Medicine;" "Form;" "Travel."

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### *New York Post-Graduate Medical School*

A new physical therapy unit was opened recently with Dr. John D. Currence as its head. The unit includes a special tank for underwater therapy.

♦ ♦

### *Long Island College of Medicine*

Dr. J. A. Curran, executive secretary of the New York Committee on the Study of Hospital Internships and Residencies, has been appointed dean, succeeding the late Dr. Adam M. Miller.

♦ ♦

### *University of Chicago Medical Schools*

The General Education Board of the Rockefeller Foundation has given to the University of Chicago \$3,000,000 for the development of the medical school and the improvement of the university generally. Of \$360,000 to be devoted to medicine, \$250,000 continues present grants. The remainder will finance thirty-six beds in Billings Hospital which have already been converted to free beds and ten additional beds added in the Bobs Roberts Hospital for children through immediate use of the funds. With the increase in beds, 218 of the 519 beds in the various hospitals in the University Clinics will be entirely

free. The establishment of the University of Chicago Clinics and medical laboratories, which were formally opened in 1927, was made possible largely through the assistance of the General Education Board.

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*University of Nebraska  
College of Medicine*

Dr. John R. Nilsson, associate professor of Surgery, has been appointed chief surgeon of the Union Pacific Railroad.

♦ ♦

*University of California  
Medical School*

By request of the president of the university, Dr. Sproul, Dr. Langley Porter, formerly dean, has returned to the position, succeeding the late Dr. W. McKim Marriott.

♦ ♦

*University of Michigan  
Medical School*

Dr. Raymond W. Waggoner, associate professor of neurology, has been appointed professor and director of the department of psychiatry. Dr. Waggoner succeeds Dr. Albert M. Barrett, who died April 2, 1936. An alumnus of the school, he has been associated with its faculty since 1929.

♦ ♦

*University of Illinois  
College of Medicine*

The Gehrman Lectures for 1936-1937 were delivered in the Medical and Dental College Laboratories Building, 1853 West Polk Street, on January 25, 26 and 27, by Dr. Thomas Parran, Surgeon General, United States Public Health Service. The subject of these lectures were: (1) "Health as a Factor in Social Security;" (2) "Industrial Hygiene," (3) "Syphilis."

*Cornell University  
Medical College*

Stanley R. Benedict, professor of chemical pathology, died December 21, aged 52, at his home in Elmsford. Dr. Benedict became associated with Cornell in 1910 as assistant professor and became professor and head of the department of biochemistry in 1912.

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*University of Minnesota  
Medical School*

The Fourth Annual Lecture in the E. Starr Judd Lectureship in Surgery, established at the University of Minnesota by the late Dr. E. Starr Judd, will be given by Dr. Evarts A. Graham, professor of surgery, Washington University School of Medicine and Surgeon-in-Chief, Barnes and St. Louis Children's Hospitals, at St. Louis, Missouri.

The lecture will be held in the Chemistry Auditorium on the University campus in Minneapolis on Wednesday, February 3, at 8:15 p. m. The subject of Dr. Graham's lecture will be "Accomplishments of Thoracic Surgery and its Present Problems."

♦ ♦

*University of Vermont  
College of Medicine*

Through the efforts of Dr. Lyman Allen, professor of surgery, a book containing medical society records of interest to the medical profession in Burlington and elsewhere has been loaned to the Wilbur Library of the Fleming Museum at the University by Dr. W. M. Huntington of Rochester. Records are contained in the book of the Vermont Medical Society from its founding in 1813-14 to approximately the middle of the nineteenth century. There are also

included in the book records of the Washington County Medical Society from the time of its founding to 1844. Washington County was then known as Jefferson County.

The book consists entirely of hand-written manuscript, considerably yellowed with age, and is bound in sheepskin. The annals contained in it are source material, of value to students of early Vermont medical history and doctors. Many such works are to be found in the Wilbur Library, which houses many early Vermont books and papers. The library is, according to its librarian, Mrs. James E. Donahue of Essex Junction, of much value to those engaged in research which is directed toward learning more of the life and activity that went on in early Vermont, having many original documents and books to which research workers may refer. This fund of original material is being steadily added to by loan, gift and purchase.

Senior medical students are studying infant feeding at the University Farm, where they see how the cows are cared for, what is done with the milk, and what is the difference in food contents in the milk of the different breeds of cows. Then they go to the L. E. Brigham milk plant and are shown such processes as cooling, pasteurizing and bottling of milk. This is the first time such a field trip with practical demonstrations has been made in this class in the medical school.

The library has received gifts of books from the medical library of Dr. Cullen Bullard, class of 1829, and of Dr. G. B. French, the father of Mr. Harold F. French of Montpelier. The books from Dr. Bullard's collection were presented by a descendant, Miss Mildred Bullard of Vergennes. Among the 122 volumes

given were works of historic medical value, and a number of first editions. The books from the library of Dr. French are also of historical value.

♦ ♦

#### *Western Reserve University School of Medicine*

Dr. William T. Corlett, professor emeritus, has furnished and endowed a study in the Cleveland Medical Library dedicated to research in dermatology and syphilology. The Library has several of these rooms where members retire to pursue studies.

The Corlett Study is furnished with the handsome mahogany which graced the donor's office before his retirement. His own library on dermatology and syphilology fills three walls, books in English, German, French, Italian and Japanese. Old, rare items include the first book on dermatology written in America in 1845 by Dr. Noah Worcester, early professor of Western Reserve.

Decorations of the room include many fine busts and portraits of medical men, especially those active in dermatology.

♦ ♦

#### *University of Western Ontario Faculty of Medicine*

Dr. Madge Thurlow Macklin was one of the twelve speakers invited to address the Cancer Institute of the University of Wisconsin at Madison, September 7-9, 1936. Dr. Macklin's subjects were "The Role of Inheritance in Cancer in Man" and "The Roles of Chronic Irritation and Heredity in Producing Cancer in Man."

Dr. Macklin also addressed the Cancer Forum held in Philadelphia, Pa., December 2, 1936, on "The Brighter Side of the Cancer Problem," and the County Medical Society of Philadelphia on the same date,

on the subject, "The Rôle of Heredity in Cancer."

Dr. Macklin has for twelve years been engaged in a study of heredity in human diseases.

♦ ♦

*Temple University  
School of Medicine*

New appointments: Thomas Klein, professor of clinical medicine; Sherman F. Gilpin, clinical professor of neurology.

Promotions: Samuel B. Hadden, to clinical professor of neurology; Edwin Sartain Gault, to associate professor of pathology and bacteriology; Harry E. Bacon, to assistant professor of proctology and Daniel J. Donnelly, to assistant professor of medicine.

♦ ♦

*University of Maryland  
School of Medicine*

December 18, 1936, was set aside as "Rowland Day" in recognition of the twentieth anniversary of Dr. J. M. H. Rowland's appointment as dean of the medical faculty. A portrait of Dr. Rowland, painted by Mr. Thomas Corner, was presented to the University by the Alumni Association of the Medical School at formal exercises. Presiding at these exercises was Dr. Aruthur M. Shipley, professor of surgery. Dr. Thurman D. Kitchin, president Wake Forest College, Wake Forest, N. C., addressed the group. The portrait of Dr. Rowland was presented by Dr. Charles Bagley, Jr., and accepted on behalf of the University by Dr. H. C. Byrd, president. During the course of the afternoon, special clinics were held in the Gordon Wilson Hall of the University Hospital. That evening a testimonial dinner was given in Dr. Rowland's honor.

Dr. Walter D. Wise, professor of surgery, acted as toastmaster. The speakers were: Dr. Alan M. Chesney, Dean of the School of Medicine, Johns Hopkins University; Dr. Maurice C. Pincoffs, professor of medicine, University of Maryland School of Medicine; Hon. Samuel K. Dennis, Chief Judge of the Supreme Court of Baltimore City, and Dr. Charles Reid Edwards, professor of clinical surgery, University of Maryland, School of Medicine.

Dr. Wise presented a bust of Dr. Rowland, the work of his daughter, Mrs. Carl Clarke, to the Medical School. This bust was formally accepted on behalf of the Medical School by Dr. A. J. Lomas, superintendent of the Hospital.

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*Washington University  
School of Medicine*

**JACKSON JOHNSON SCHOLARSHIPS IN MEDICINE:** For students of outstanding ability a few scholarships carrying annual stipends of \$300.00 to \$1,000.00 are now available for award to applicants for admission to the first year class of the School of Medicine.

These scholarships will be awarded without regard to financial need, to students judged to possess definitely superior qualifications for the study and for the practice of medicine, or for careers in the medical sciences. The amount of the stipend in each case will be decided after the award of the scholarship, and will depend on the financial need of the individual.

Awards may be renewed, with the same or different stipends, for later years of the medical course, provided the achievements of the scholar justify a continuance of the award. If the work of a Jackson Johnson Scholar

is not maintained at the high level required of holders of these scholarships, but is nevertheless well above the minimum standards set by the University for medical students, the student may secure other financial aid, if necessary to continue his course, to the extent that other scholarships and loan funds are available.

Application blanks for the Jackson Johnson Scholarship and further information concerning them will be supplied on request to The Registrar, Washington University School of Medicine, Scott and Euclid Avenues, St. Louis, Missouri.

Dr. Alexis F. Hartmann was recently appointed professor of pediatrics and physician-in-chief to the St. Louis Children's Hospital succeeding the late Dr. W. McKim Marriott.

Dr. Hartmann will deliver the F. A. Packard Memorial Lecture before the Philadelphia Pediatric Society, April 13. His subject will be "Metabolism on Lactic Acid and Its Practical Applications."

Dr. Evarts A. Graham, professor of surgery, delivered the Judd Lecture at the University of Minnesota, February 3. His subject was "Accomplishments of Thoracic Surgery and Its Present Problems."

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#### *College of Medical Evangelists*

The medical school has recently acquired the added facilities of three new buildings. On the Loma Linda campus a new pathology building and an anatomy building have been added, while in Los Angeles a new hospital unit has just been completed. Additional building improvements are contemplated.

Recent changes in the faculty personnel are as follows:

Dean E. H. Risley has returned to the Loma Linda division after a

sojourn in Los Angeles for one year. Dr. W. E. Macpherson, former professor of physiology, has been appointed to the duties of the Dean in the clinical division and as associate professor of medicine. Dr. Hermon C. Bumpus was appointed professor of urology and head of the department. Dr. Lawrence White has been promoted from instructor to assistant professor of surgery.

The following instructors have been appointed: Drs. Howard Ball and Roland Osborne in pathology; Drs. A. H. Hurd, Mina Ashley and Louis P. Thorpe, pediatrics; Drs. Elizabeth Larsson and Ralph Walker in obstetrics and gynecology; Drs. Harold Boyd, Marvel Beem and Charles Taylor in surgery; Dr. Kenneth Kellogg in physiology; Dr. Thomas Judefind in bacteriology.

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#### *University of Colorado School of Medicine*

New appointments: Dr. William M. Bane, professor of ophthalmology and head of the department; Dr. Claude E. Cooper, professor of otolaryngology and head of the department; Dr. Casper F. Hegner, professor of surgery and head of the department; Dr. Philip Work, assistant professor of neurology and acting head of the department.

Retired: Dr. Edward Delehanty, professor of neurology, retired from active service June 30, 1936, and was appointed professor of neurology, emeritus; Dr. Henry W. Wilcox, retired June 30, 1936, and was promoted to the rank of associate professor of orthopedic surgery, emeritus; Dr. Severance Burrage, associate professor of bacteriology, and Dr. Moses Kleiner, associate professor of therapeutics, retired June 30, 1936.

Deaths: Dr. William C. Bane, professor of otolaryngology, emeritus, died January 20, 1937; Dr. Henry Sewall, professor of medicine,

emeritus, died July 8, 1936; Dr. E. Barber Queal, professor of physiology, emeritus, died October 21, 1936; Dr. Elbert B. Swerdfeger, assistant professor of otolaryngology, died February 10, 1937.

Resignations: Dr. Edward F. Dean, associate professor of surgery, resigned August 15, 1936; Dr. Donald H. O'Rourke, assistant professor of ophthalmology, resigned October 5, 1936.

Dr. John W. Amesse, associate professor of pediatrics; Dr. Ralph W. Danielson and Dr. Maurice E. Marcove, associate professors of ophthalmology; Dr. Paul D. Garvin, assistant professor of clinical pathology; Dr. T. Leon Howard, Dr. Richard G. Smith and Dr. Harry H. Wear, assistant professors of surgery (urology); Dr. Atha Thomas, assistant professor of surgery (orthopedics).

Two new buildings have been erected on the campus. The Charles Denison Memorial Library has been moved into a new building, known as the Charles Denison M.D. Memorial Library, which is a gift to the School of Medicine from Mrs. Ella Strong Denison as a memorial to her husband, the late Charles Denison. The facilities of the library have been increased greatly. The new reading room is four times as large as the former one, and the stack room space is six times as large as the old one. Besides the reading room and stack rooms, there are other rooms for the use of the faculty members and a treasure room to be used for old and rare books, old instruments, and other gifts to the institution. In addition to the library, the building also has an auditorium on the second floor, having a seating capacity of 500.

The other new building is a gymnasium and recreation building for use by the student body. This building is erected on the Wetherill Field, that part of the campus recently giv-

en by Dr. Horace G. Wetherill, formerly of Denver, but now living in Monterey, California.

A mural painting on the wall of the clinical amphitheatre, by Don Griffith, depicts the history of medicine from the time of Aesculapius on to Hippocrates, and finally to Galen.

The School of Nursing reopened last September, having been closed for a period of four years. The entrance requirements have been changed so that now two years (ninety quarter hours) of collegiate work are required of all students admitted. The degree Bachelor of Science in Nursing is conferred on the completion of the prescribed course.

Prizes awarded: The Alpha Omega Alpha Prize in anatomy, to Rayburne W. Goen, freshman student. The Chester H. Elliott Memorial Prize in pathology, to Charles E. Conner, sophomore student. The Dr. James C. Todd Prize in clinical pathology, to Nathan M. Spishakoff, senior student. The Edward G. Stoiber Scholarship to Gerald W. Hurst, junior student.

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#### *University of Toronto Faculty of Medicine*

Dr. William Boyd, erstwhile professor in the University of Manitoba School of Medicine, has been appointed professor of pathology at Toronto, succeeding the late Oskar Klotz.

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#### *Columbia University College of Physicians and Surgeons*

The college will develop a coordinated program of education, research and care of the sick in conjunction with the hospitals of the New York Metropolitan area, believing that such action will elevate the standards of medical and surgical care and provide the university with a greater opportunity for public service.

*Ohio State University  
College of Medicine*

On March 4, 5 and 6, the alumni of the Ohio State University College of Medicine will celebrate the 103rd anniversary of the founding of the Willoughby Medical College, from which the present college traces its origin in an unbroken line.

The celebration will take the form of one day of conferences and two days of postgraduate assembly, in which 45 members of the faculty and five guest speakers will take part.

Guest speakers will be: Dr. Chas. Gordon Heyd, New York City, President of the American Medical Association; Dr. Arthur C. Bachmeyer, director of the University of Chicago Clinics; Dr. Henry E. Sigerist, professor of historical medicine, Johns Hopkins University School of Medicine; Dr. Charles W. McClure, O.S.U. '10, associate professor of gastro-enterology, Boston University School of Medicine, and Dr. Gatewood, O.S.U. '11, associate clinical professor of surgery, Rush Medical College.

Thursday, March 4, will be given over to an open house at the College of Medicine. The various preclinical departments and the research laboratories will have certain demonstrations open for inspection. In addition, every physician in the state is invited

to bring his special problem to the various clinical teachers, who will be glad to confer with him about its solution.

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*Cornell University  
Medical College*

Dr. Wilson G. Smillie, of the Harvard School of Public Health, has been appointed professor of public health and preventive medicine and head of the department.

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*Jefferson Medical College*

Dr. Louis H. Clerf, formerly professor of bronchoscopy and esophagoscopy in the Jefferson Medical College, has been elected professor of laryngology and bronchoscopy. Dr. Clerf, in addition to his present duties in the College and Hospital, will assume the duties formerly discharged by Dr. Fielding O. Lewis, who has been made emeritus professor of laryngology and consulting laryngologist to the Jefferson Hospital.

The William Potter Memorial Lecture was delivered by Henry A. Christian, M.D., A.M., LL.D., S.D., Hersey Professor of the Theory and Practice of Physic, Harvard Medical School, on February 11, 1937. His subject was "The Fruition of a Clinician."

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## General News

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### *International Congress of Anatomists*

The Fourth Federated International Congress of Anatomists was held at Milan, Italy, September 2-8, 1936. More than 330 anatomists were in attendance, representing twenty-four different countries. Aside from Italians, who were naturally well represented in their own country, most members came from France (over sixty) and after that from Germany (about thirty-five) but other countries such as Great Britain, Switzerland, Belgium, Austria, Russia, etc., sent good deputations. Some men came from remote points such as Japan, South America and India.

The list of papers contained 150 titles including all the anatomical sciences. Many dealt with studies of cells under normal and experimental conditions and embryological papers were numerous.

The important task of revision of gross anatomical terminology was begun by a special committee of anatomists, who were appointed by the delegates of the ten anatomical societies represented, to deal with it. This committee is known as the "International Commission on Anatomical Nomenclature" and its function is to edit a standard set of anatomical terms for use throughout the world. The new "Nomina Anatomica" of the Anatomische Gesellschaft (1936) is to be the basis of this revision, which, it is hoped, will be ready in about two years. Although the terms will be in Latin, they may be readily translated into the vernacular and it is hoped that a

uniform set of English equivalents will be composed by those interested. This will be of immense advantage to English-speaking people who have to use anatomical terms.

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### *Ludvig Hektoen Lecture*

Dr. Ernest W. Goodpasture, professor of pathology, Vanderbilt University School of Medicine, Nashville, delivered the thirteenth Ludvig Hektoen Lecture of the Frank Billings Foundation before the Institute of Medicine of Chicago, January 22. The subject of his illustrated lecture was "Vaccinia."

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### *Washington, D. C., Civic Award*

Dr. Custis Lee Hall, assistant professor of orthopedic surgery, George Washington University School of Medicine, was presented, January 4, with the first Citizens' Service Award for 1936. The cup, which will be awarded annually to the citizen who is considered to have rendered the most unselfish service to the whole community, is provided by the *Washington Times*; the recipient is selected by a representative citizens' committee. Dr. Hall was chosen for his work among crippled children and adults.

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### *Eli Lilly and Company Award*

The \$1,000 prize and bronze medal of Eli Lilly and Company, Indianapolis, was presented at the annual meeting of the Society of American Bacteriologists in Indianapolis, December 29, to Dr. Harry Eagle, of Johns Hopkins Hospital, Baltimore,

for accomplishments in research on immunity to various diseases, notably syphilis. A committee composed of members of the Society of American Bacteriologists, the American Association of Immunologists and the American Society for Experimental Pathology selected Dr. Eagle, whose research has been done largely in the medical schools of Johns Hopkins University and the University of Pennsylvania.

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#### *Research Committee of General Mills*

Dr. Alonzo E. Taylor, director of the Food Research Institute at Stanford University, Calif., since 1921, has been appointed chairman of the research committee of General Mills, Inc., Minneapolis, to have general direction of the firm's research in diet and nutrition.

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#### *Fourth Harvey Lecture*

Dr. Rudolf Schoenheimer, assistant professor of biologic chemistry, Columbia University College of Physicians and Surgeons, delivered the fourth Harvey Lecture of this season at the New York Academy of Medicine, January 21, on "The Investigation of Intermediary Metabolism with the Aid of Heavy Hydrogen."

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#### *Frauenthal Travel Scholarship*

The Henry W. Frauenthal Travel Scholarship of the Hospital for Joint Diseases has been awarded to Dr. Charles J. Sutro for 1936-1937. Dr. Sutro, a graduate of Long Island College of Medicine, has been associated with the hospital since 1931 and last year held the Mr. and Mrs. Frederick Brown Orthopedic Research Fellowship.

#### *Judd Lectureship in Surgery*

Dr. Evarts A. Graham, Bixby professor of surgery, Washington University School of Medicine, St. Louis, delivered the fourth annual lecture in the E. Starr Judd Lectureship in Surgery, February 3, in the chemistry auditorium of the University of Minnesota, Minneapolis. His subject was "Accomplishments of Thoracic Surgery and Its Present Problems." The lectureship was established at the university by the late Dr. Edward Starr Judd, Rochester.

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#### *Study of Medical Costs*

At a recent meeting of the council of the Minnesota State Medical Association, a committee was named to investigate the possible sources of financial aid for a study of medical costs in the state. Members of the committee are Drs. Alfred W. Adson, Rochester, William W. Will, Bertha, and Edward A. Meyerding, St. Paul. The study will cover the cost to the student and the state of a medical education, the cost to the practicing physician of overhead, equipment, transportation, expert assistance, and the relation of physicians to population groups and related problems.

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#### *The Commonwealth Fund*

In its annual report for 1936, the Commonwealth Fund records appropriations amounting to \$1,967,153.26, intended, in the words of its founder, Mrs. Stephen V. Harkness, "to do something for the welfare of mankind."

More than two-thirds of the total was devoted to the betterment of health. Grants were made for public health service to rural communities, rural hospitals, medical educa-

tion, and medical research. Post-graduate education in medicine was emphasized, the Fund believing that such work is of major importance in improving the quality of medical service.

For the first time in several years a large share of these appropriations went to educational institutions in New York City. The largest of these was a conditional gift of \$250,000 to the College of Physicians and Surgeons of Columbia University, to meet part of the cost of enlarging laboratory facilities at the Columbia-Presbyterian Medical Center for graduate teaching in the medical specialties. The Fund also continued to help in financing a study, sponsored by the New York Academy of Medicine, of medical education in New York hospitals.

As part of its mental hygiene program the Fund also contributed to educational activities at the Babies Hospital and the New York Hospital. In both, full-time psychiatric consultation has been provided for staff and students in pediatrics. A similar project at the Children's Hospital in Boston is also being supported by the Fund.

The Fund continued to work through various channels for the improvement of medical practice in rural areas, particularly in Tennessee, Mississippi, and the northern New England states. In all, 379 scholarships have now been awarded to physicians for postgraduate study at Harvard, Tulane, Vanderbilt, and other medical schools. These scholarships are designed not to encourage specialized practice, but to help family physicians to catch up with modern medicine, which many of them have had little opportunity to learn.

In the belief that improvement in rural medical service will be hastened

if newly trained physicians enter practice in country districts, the Fund offers scholarships to undergraduates in medicine at Tulane, Vanderbilt and Tufts. Thirty-nine scholarship holders have now been graduated and seven have completed their internships and have entered practice, in accordance with the terms of the grant, in towns of less than 5,000. Twelve or more well-trained young physicians will be ready for rural practice each year in the three states, Mississippi, Tennessee, and Massachusetts, where these scholarships are offered.

In Mississippi the Fund is completing a two-year series of extension courses in obstetrics offered to physicians in all parts of the state. A similar plan will be put in operation in Tennessee during the coming year. Such work is done in collaboration with the state medical society and local medical schools.

The Fund has also supported rural hospitals, public health, study of blood pressure, legal research, British-American relations, training of psychiatrists and psychiatric social workers, child guidance studies and psychiatric education.

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#### *Medical Motion Pictures*

The Committee on Medical Motion Pictures of the American College of Surgeons, of which Dr. J. Bentley Squier, of New York City, is the chairman, has prepared a catalog for the purpose of recording detailed data concerning medical and surgical films of high quality. Thus, the College can supply information regarding films which are available on a given subject, where they may be obtained and whether or not they are satisfactory for the purpose desired. Films, if accepted, must meet

basic standards set by the College and the author of the film is authorized to insert a legend which reads: "Passed by the Committee on Medical Motion Pictures of the American College of Surgeons. A list of approved pictures was published in the October, 1936, Bulletin of the College.

The address of the College is 40 East Erie Street, Chicago, Illinois.

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*United States Navy  
Examinations for Appointment*

Competitive examination for appointments to the medical corps of the United States Navy will be held in May or June, 1937.

The requirements for appointment in the medical corps of the United States Navy provide that the candidate be a citizen of the United States, between twenty-one and thirty-one years of age at the time of appointment; that he be a graduate of a Class A medical school, and have completed an internship of at least one year in a hospital accredited by the American Medical Association and the American College of Surgeons.

Examinations will be conducted at the Naval Medical School, Washington, D. C.; the Naval Hospital, Great Lakes, Illinois; and the Naval Hospital, Mare Island, San Francisco, California. Approximately ten days will be required for the examin-

ation. Form application in duplicate should be forwarded at least one month in advance of the date set for the examination. Application blanks and further information may be obtained by addressing the Bureau of Medicine and Surgery, Navy Department, Washington, D. C.

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*World Congress  
of Universal Documentation*

The World Congress of Universal Documentation will be held in Paris, France, August 16-21, 1937, coincidentally with the Paris Exposition. The sources, forms and organization of documentation will be the topics for discussion. An international committee on documentation has been appointed. The representative from the United States is Mr. Watson Davis, director of Science Service, Washington, D. C. More detailed information as to the work of the Congress may be obtained from Mr. Davis.

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*Lewis Linn McArthur Lecture*

The thirteenth Lewis Linn McArthur lecture on the Frank Billings Foundation was delivered in Chicago, February 26, by Dr. H. Wingate Todd, Henry Willson Payne professor of anatomy, Western Reserve University School of Medicine. His subject was, "Objective Ratings on the Constitution; Based on Examinations of Physical Development and Mental Expansion in the Growing Child."

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## Abstracts of Current Literature

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### *Education of a Surgeon*

In his presidential address, delivered at the annual meeting of the American College of Surgeons in 1936, Dr. Eugene H. Pool, of New York City, discussed the education of the surgeon, past and present. He said, in part:

"With the completion of the undergraduate course, i.e., the attainment of a medical degree, certain factors in the present system for further training give rise to just criticisms. Almost all graduates take an internship. But we must face the fact that no interne system has proved wholly satisfactory. I believe that this is one of the most important subjects for study and readjustment. Under the average resident system, the interne wastes much of his time; under the old-fashioned and usual system, the interne gets more opportunity than he can digest, and at the expense of others who could properly profit thereby. Under both systems there is too early specialization. Every surgical aspirant should have at least one preliminary year on a general medical service, and should at some time receive instruction and experience in the psychiatric aspects of general hospital practice—two features which are ordinarily neglected.

"There is perhaps a growing tendency to slight pathology and physiology throughout all the developmental years. The laboratories of a hospital should be so laid down and administered as to attract the clinician on his daily rounds. Intimate contacts between clinicians and laboratory workers should be encouraged. Without such a close union and at-

mosphere the scientific progress in an institution will quickly wane.

"We all favor the extension of studies beyond prescribed internships, but the expense prevents many promising candidates from pursuing such a course. Fellowships should, therefore, be more generally available, and greater efforts should be made to obtain endowments for this purpose.

"While present day surgery is, in general, on a high standard, there is still some commercialism, as evidenced by excessive charges, too radical and unnecessary surgery, and fee-splitting. The public and the profession are frowning more and more upon such practices, and idealism and altruism are becoming increasingly the dominating motives. If conditions are to be fundamentally improved, the young must be influenced in their formative years. This is difficult under our present educational system. The obligation is a heavy one and must be borne chiefly by the teachers in our medical schools.

"The weakest and least developed feature in medical education is postgraduate surgery. It is impossible under present conditions to provide operative instruction. Only extensive practical experience can qualify a man to operate with safety to the patient. Theoretical postgraduate courses which include only the viewing of, and even the assisting at, operations give a man a degree of self-confidence which is dangerous. In the early days of American medicine, operative clinics were utilized mainly for surgical instruction. They were widely attended and were often spectacular affairs. In visiting operative

clinics I have often been impressed by the fact that they are relatively useless for purposes of instruction, and that from a humanitarian point of view, they are ill-advised.

"But graduate training in surgery must be provided. There should be a carefully directed and supervised apprenticeship, in which the graduate actually participates in practical surgical work. Such a graduate course should not be merely a classroom, operating room, and laboratory function, and it should not be confused with postgraduate study, i.e., the further pursuit of an already acquired specialty. Whenever possible it should embrace continued study of the basic medical sciences, such as anatomy, physiology and pathology, and the auxiliary clinical branches, such as radiology. The great teaching centers and medical schools are inadequate for this purpose. There are, however, almost unlimited facilities in the nonacademic hospitals

throughout the country. These should be organized and used for the purpose. The present form of internship is wasteful and should be modified so that the material shall be shared between internes and other graduate students, such as fellows. The fellows should be accepted for a relatively long period and should be allowed to operate under instruction and supervision. The character of their work and their personalities should be carefully weighed in the decision as to their qualifications as surgeons.

"The public must be protected from the incompetent and casual operator. Before embarking on a surgical career, a man should be required to have something more than a medical degree. A certification or registration based upon training, character, and ability should be obligatory. The qualifying and examination of a candidate should be the function of the profession."

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## Book News

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### *Laboratory Outline in Filterable Viruses*

By Roscoe R. Hyde, Professor of Immunology, School of Hygiene and Public Health, Johns Hopkins University. The Macmillan Company, New York. 1937. Price, \$1.50.

These exercises are designed to serve the student as an introductory laboratory guide to the study of the filterable viruses. Each exercise is planned with the idea that it can be carried out in the time allotted for the laboratory period. The directions are stated briefly and planned for the instructor to supply the technical details in connection with each exercise. The course is given three mornings a week for eight weeks.

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### *Bones: A Study of the Development and Structure of the Vertebrate Skeleton*

By P. D. F. Murray, Cambridge University, England. Cambridge: At the University Press. New York: The Macmillan Company. 1936. Price, \$2.50.

The author discusses certain aspects of the development and structure of the skeleton, and in particular the question of the relation between the structures seen and the morphogenic factors intrinsic in the elements, on the one hand, and those, mainly of a mechanical nature which act on it from without on the other. The main mass of the book is in the first four chapters which deal with the embryonic and post-embryonic development and with the structure of the normal and modified bony skeleton considered in relation to the function

which it fulfills. In a brief fifth chapter, cartilage is dealt with from the same point of view. The sixth chapter is devoted to a consideration of the mechanisms by which mechanical forces find expression in the architecture of bone. The seventh chapter is a brief summary.

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### *Physical Diagnosis*

By Ralph H. Major, M.D., Professor of Medicine in the University of Kansas. W. B. Saunders Company, Philadelphia. 1937. Price, \$5.

This is intended to be a textbook of physical diagnosis, hence the author devotes himself to showing that physical signs are produced by physical causes. To make certain that certain signs to many of which an eponymic term has been attached will be understood as they should be, he quotes the original (translated) description. In many instances, he employs the illustrations used by the pioneers in certain fields of investigation. Considerable space is devoted to the examination of the chest, but pulse, bloodpressure, pain, general inspection of the body as a whole, cardiovascular diseases, abdomen, genitalia, the extremities and the nervous system are all of them given careful consideration. The chapter on history taking and recording is splendid. "History taking is an art" certainly is stating it correctly. To do it well, it is necessary for the student to become adept in doing what the author so well describes in the preceding chapters. Many bibliographic references are given and nearly 500 illustrations aid in elucidating the text. This is a good book.

